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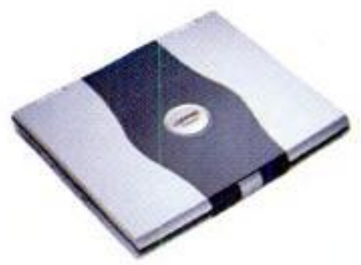

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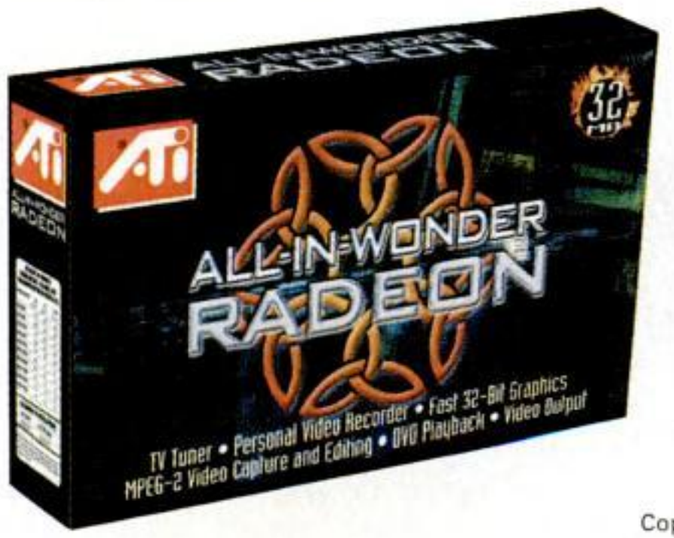

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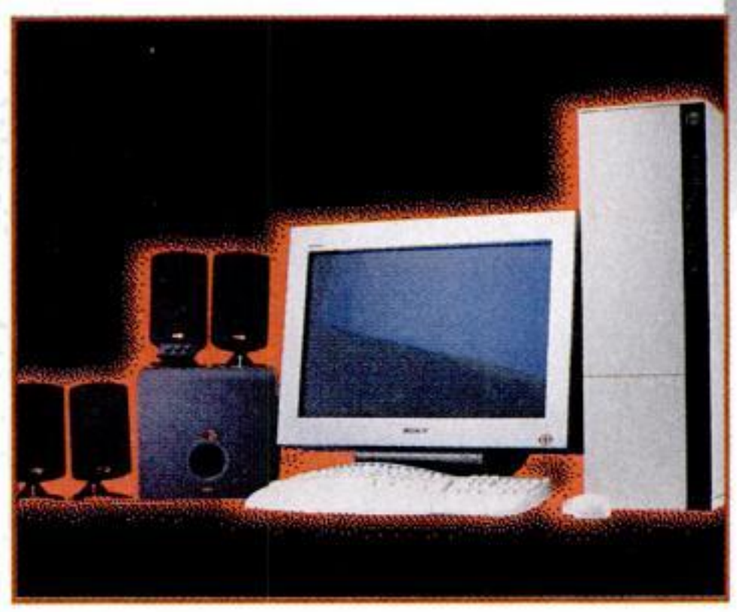
MAXIMUM PC
NOVEMBER 2000

THIS ISSUE

32 PC Entertainment

46 VHS to CD



58 Chamsalot System

FEATURES

32 PC Entertainment Smorgasbord
Does TV rot your brain? After hours in front of a 52-inch plasma display, your brain will feel like runny eggs. Here's how to make an MP3-DVD-PVR home entertainment center.

46 Convert VHS Tapes to Digital CDs
How to take a pile of old VHS tapes, drop them into digital format, and churn out interactive video CDs for the masses.

58 The $10,000 Reader Challenge
Can a reader with obscene funding and an unnatural obsession with creating the ultimate system turn our heads? Find out inside.

TECH FILES

23 Watchdog
Cybermax and Quantex split the scene, AIM drivers found, and Pentium IIIs recalled.

62 Lab Notes
Gordon blows smoke in the Lab to develop cooling strategies for your Hot Mama of a PC.

65 Ask the Doctor
Partitioning pointers, VIA vexation, and where to blow your hot air.

PRODUCTS

27 Peripheral Vision
Pester your kids from across the globe with a world phone, never get lost again with an eMap GPS receiver, and make talking to yourself at least *look* cool with Sony's newest voice recorder.

70 Reviews
Top speed for top dollar is **Creative Lab's Annihilator 2 Ultra**... **Hypersonic's Sonic Boom** breaks the benchmark barrier... **Wireball's Assassin** lines 'em up and takes 'em out like a professional... Share broadband connections and keep hackers out with broadband routers from **D-Link**, **Ramp Networks**, and **NetGear**... Thunderbird mobos from **MSI**, **ASUS**, and **Tyan** offer Intel-crushing innovation... **ATI's** newest **All-in-Wonder** wants for more... Case studies of new **Cooler Master**, **Antec**, and **Inwin** ATX cases... The **Qbe** (pronounced "cube") **Cirrus** is crap (pronounced "crap")... The **Palm m100** needs more power under its candy-coated shell... No cheese for the not-so-nice mice from **Microsoft** and **Logitech**... **Evolva** never evolves into a stellar game...

NEWS

16 Inside Sources
PC Previews, News, and Factoids
We take a closer look at peer-to-peer file sharing sites and life without *Napster*, MP3.com picks up the copyright violation tab, and the government whines that gamemakers cater violence to kids.

VOICES

8 Ed Word
Head Maximum honcho **Jon Phillips** reveals the stumbling blocks of being a power user and how to fight the conspiracy. Trust no one!

11 CommPort
The Dream Machine: You either love it or you hate it—to the tune of 100 letters to the editor every week. Find a small sampling inside.

28 Fast Forward
Hear the gushing praise, concerns, and predictions for Intel's new Pentium 4 from **Tom Halfhill**.

31 Game Theory
T. Liam McDonald tells how multiplayer sports games can breathe new life into the mainstream online gaming arena.

104 Glitch
Every month, *Maximum PC* prints "fake" news "articles" on the "last" page of the "magazine." So when you turn to page 104, don't get your boxers in a bunch if you read something that just doesn't seem....quite...right.

On the cover:

- PC Ent 32
- Napster 16
- Cooling Tips ..62
- Pentium 4 28

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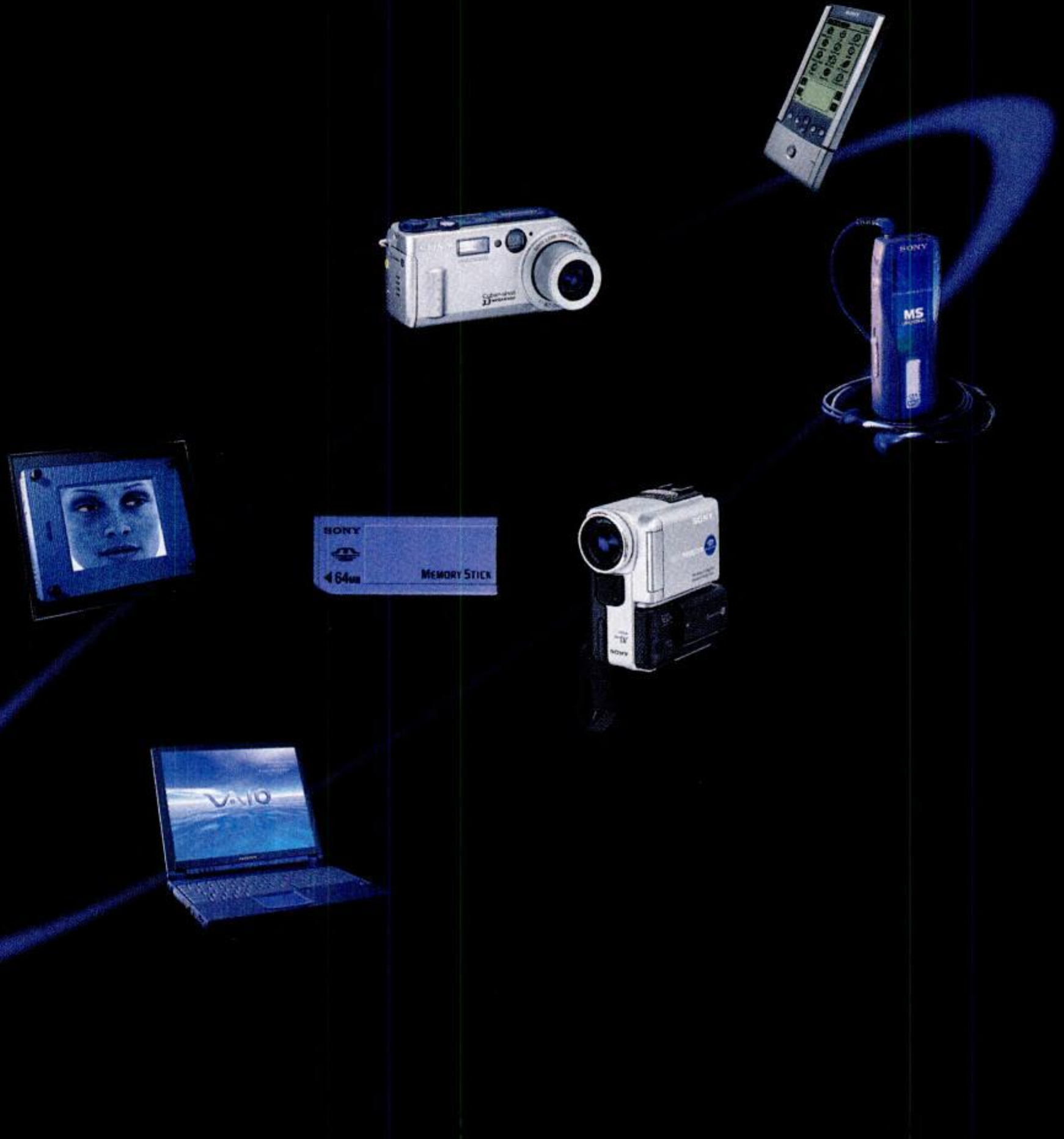

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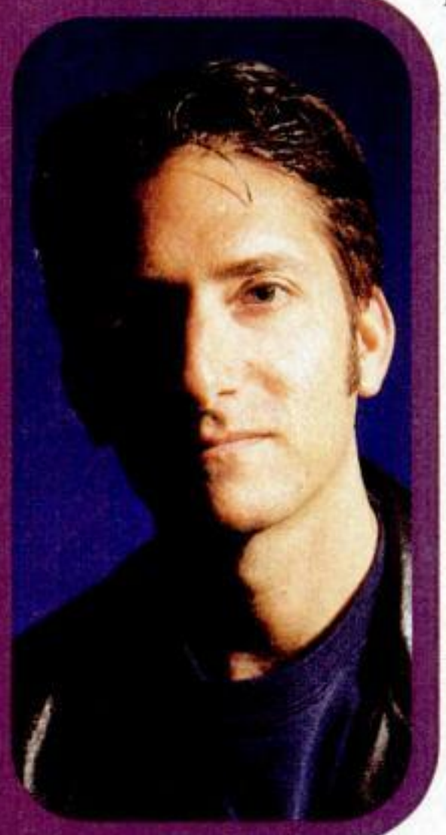
EDWORD

Defeating the Anti-Power User Conspiracy



It's a tricky time to be a PC power user. A confluence of evil forces is conspiring to make our lives as difficult as possible:

▶ Vendors are closing up shop, leaving power users without ongoing support. Do the names Hi-Val, Smart and Friendly, and Quantex ring a bell? They're just three of the companies that were once celebrated by *Maximum PC*, but now walk among the dead. In our report on page 18, you can see a larger list of the fallen vendors. Some might offer post-mortem contingency plans for an approximation of "help support," but they certainly won't be releasing any driver updates for hardware you already own.

▶ Vendors are shipping product that just plain doesn't work. We felt the brunt big-time when testing the Alienware system reviewed on page 58. The system's four-drive, striped RAID array actually performed worse than a single-drive config, and neither Alienware nor the individual hard drive and RAID controller vendors could offer a fix. Alienware blew it by shipping a rig with a known defect, while Seagate (the drive manufacturer) and DPT (the controller card manufacturer) blew it by distributing products with serious compatibility issues. We don't know whether Seagate or DPT is to blame for the RAID snafu, but both companies are top-tier vendors, and, as power users, we should be able to comfortably assume that each company tests its parts with the other company's products.

This isn't the first time a "power-box" vendor sent us a rig with a gimpy RAID array. In March 1998, we reviewed a Falcon Northwest system whose striped RAID drives also limped at absurdly low levels. And nestled inside that Mach V rig was—surprise, surprise, surprise—two Seagate hard drives and a DPT controller! What's the deal? Don't Seagate and DPT communicate with each other at all? It's not as though either one of the companies is too insignificant to consider during quality-assurance testing.

Quality-assurance breakdowns aren't limited to RAID products, but they do tend to pop up in components primarily purchased by folks who upgrade and build their own rigs. For example, high-end videocards and "alternative" core-logic chipsets (such as those made by VIA) often don't work with each other. But that's the price you pay for technology that isn't expressly built to be dummy-proof.

Power users can be their own worst enemies, especially when building systems from scratch.

▶ Finally, power users can be their own worst enemies, especially when building systems from scratch. A PC is a delicate amalgamation of components and BIOS settings. If you don't know what you're doing, you can engineer a rig with a serious design flaw. The system might work properly for six months, then—boom—the flaw sets off a chaotic chain reaction. One of the most common mistakes is practicing "stupid cooling tricks." Check out page 62 for details.

So what's a power user to do? First, read our monthly Watchdog column, where we report on which vendors are closing up shop. Second, immerse yourself in product critiques. You can start by reading our system reviews, where we point out known compatibility problems. Finally, when building a system yourself, begin with a well-charted game plan. Map out a qualified cooling strategy and learn how every single BIOS tweak might affect system stability.

You *can* beat the anti-power user conspiracy. Information is your strongest weapon.

—Jon Phillips

MAXIMUM PC
NOV00 vol5issue11

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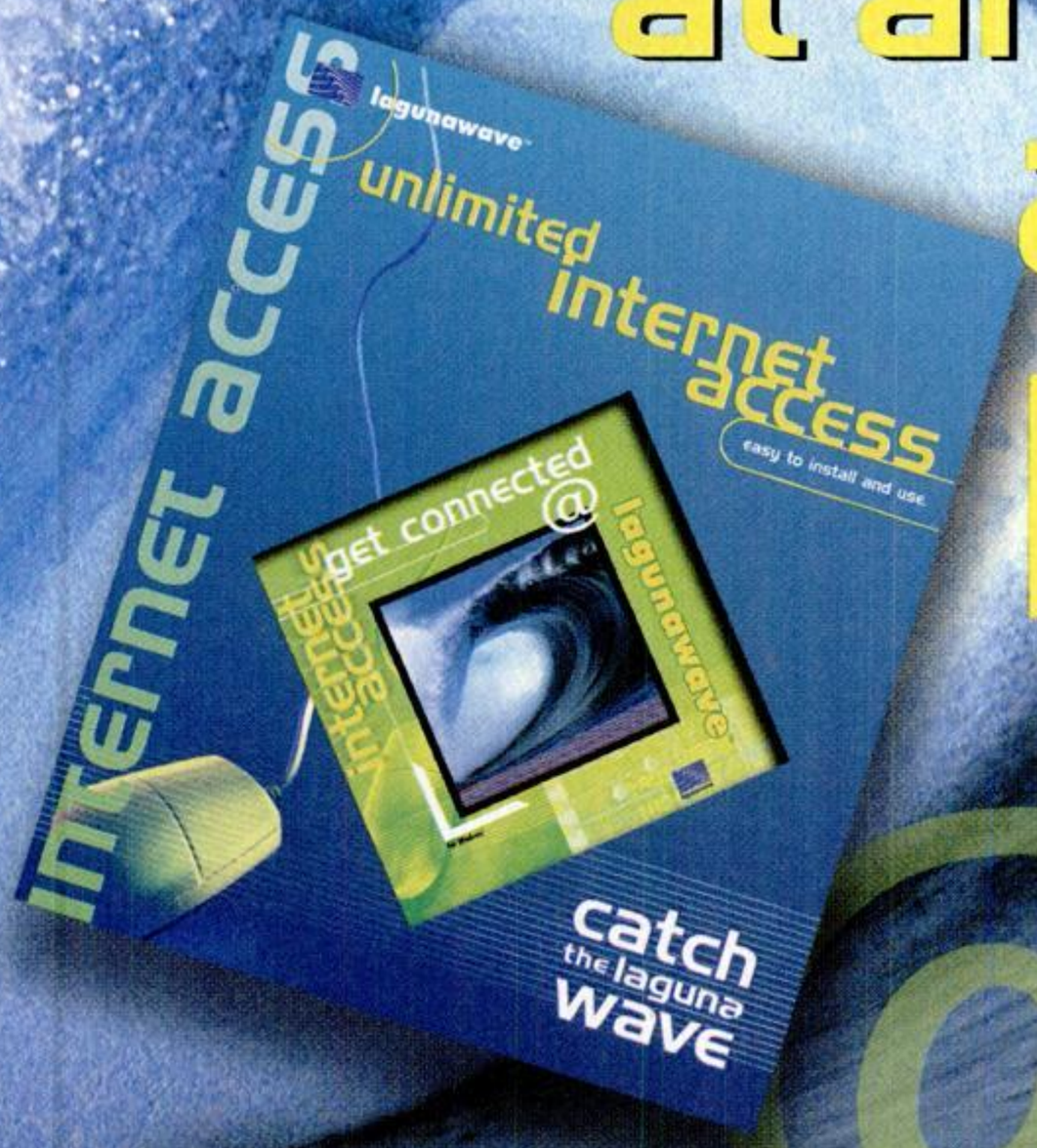

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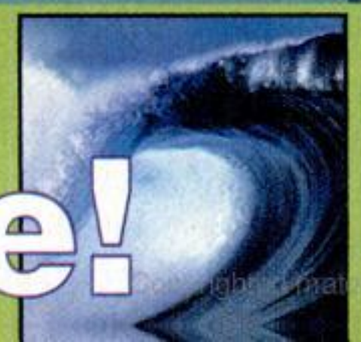

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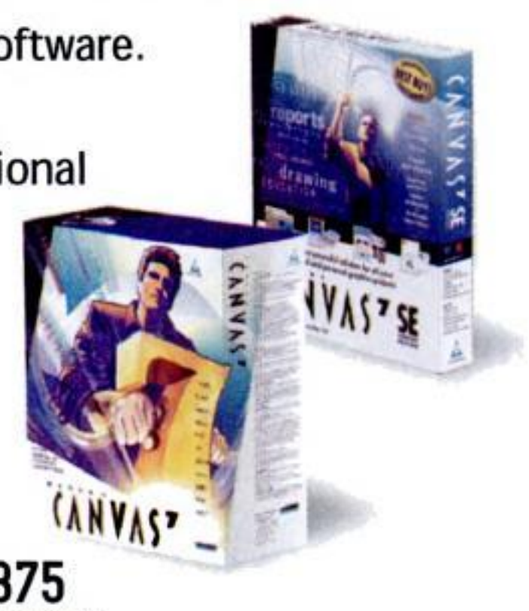

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Is the Dream Obscene?

When we decided to lift the Dream Machine's price ceiling, we knew we'd be ushering in a mess of controversy. And the letters, they did fly! We thank the hundreds upon hundreds of readers who wrote in either to praise or condemn the Dream Machine's new direction. By and large, the jury was split on our $12,000 lesson in excess. Below, you'll find a smattering of responses.

Nay!

Dream Machine 2000 is a nightmare. It seems like you all got together with daddy's credit card, sent everyone out to get their favorite parts, and then constructed Frankenstein's computer. I think the machines you built under a $5,000 ceiling showed more thought and ingenuity.

—Peter D'Apice

Dream Machine 2000 is absolutely ridiculous. Almost 12 grand? Give me a break. Even $5,000 is pushing the limit of the majority of your readers, but at least it's in the realm of possibility. For 2001, you might even consider putting a little more research into your components, and hold the limit to $4,000! I can't even afford the ticket to *see* a $12,000 box.

—Stephen Germany

You all got together with daddy's credit card, sent everyone out to get their favorite parts, and then constructed Frankenstein's computer.

Who's going to be senseless enough to spend $2,000 on memory modules alone and then try—I repeat *try*—to find a 1GHz Pentium III, let alone two? Especially at such a ridiculous price, when the Athlon is a great (if not better) choice at a substantially lower price. Staying within the price limit should continue to be the goal of the Dream Machine. What good is a PC if it's just a dream?

—Jesus Paolini

I thought your Dream Machine article was very informative. I appreciated your dual boot setup, but the monster you created was anything but a dream come true. Instead, I felt that cramming your system with the most expensive hardware was immature and, because it cost more than what some people earn in a year, just plain ridiculous. Instead of opening up your wallets, you should open up your minds and come up with something really innovative—like adding the heat pipe you didn't have time for.

—V. Luna

Yea!

Several of my friends and I drooled over DM2000, component by component, creating small pools around our feet. Like you said, no one else is likely to build one of these. We feel that there can be only one improvement to your work: Build the budget alternative and then compare them! This would give you the opportunity to highlight just how much better the Dream Machine is against the competitor and give readers the ability to compare specs and price/performance differences between the two boxes.

—David Jones

By all means, continue to build the most ridiculous, money's-no-object machine possible! After all, you guys are *Maximum PC*, not *Highest Performance for a Reasonable Amount of Money PC*. Even if nobody actually builds, wants, or can afford the exact machine you've configured, you're doing us a service by nailing down the most exotic *parts* in existence. I can't drop $12K on the whole machine, but the case, videocard, and CD-R drives—those are within my budget!

—John Bradley

By Jove, I think you've got it! That's the computer that's been swimming around in my head ever since I first clicked on a mouse! The fireworks, the speed, incredulousity (is that a word?) of it all! It just excites me to think that maybe one day I'll be able to build one for myself. It's not practical, but it's beautiful.

—Ender Wiggin

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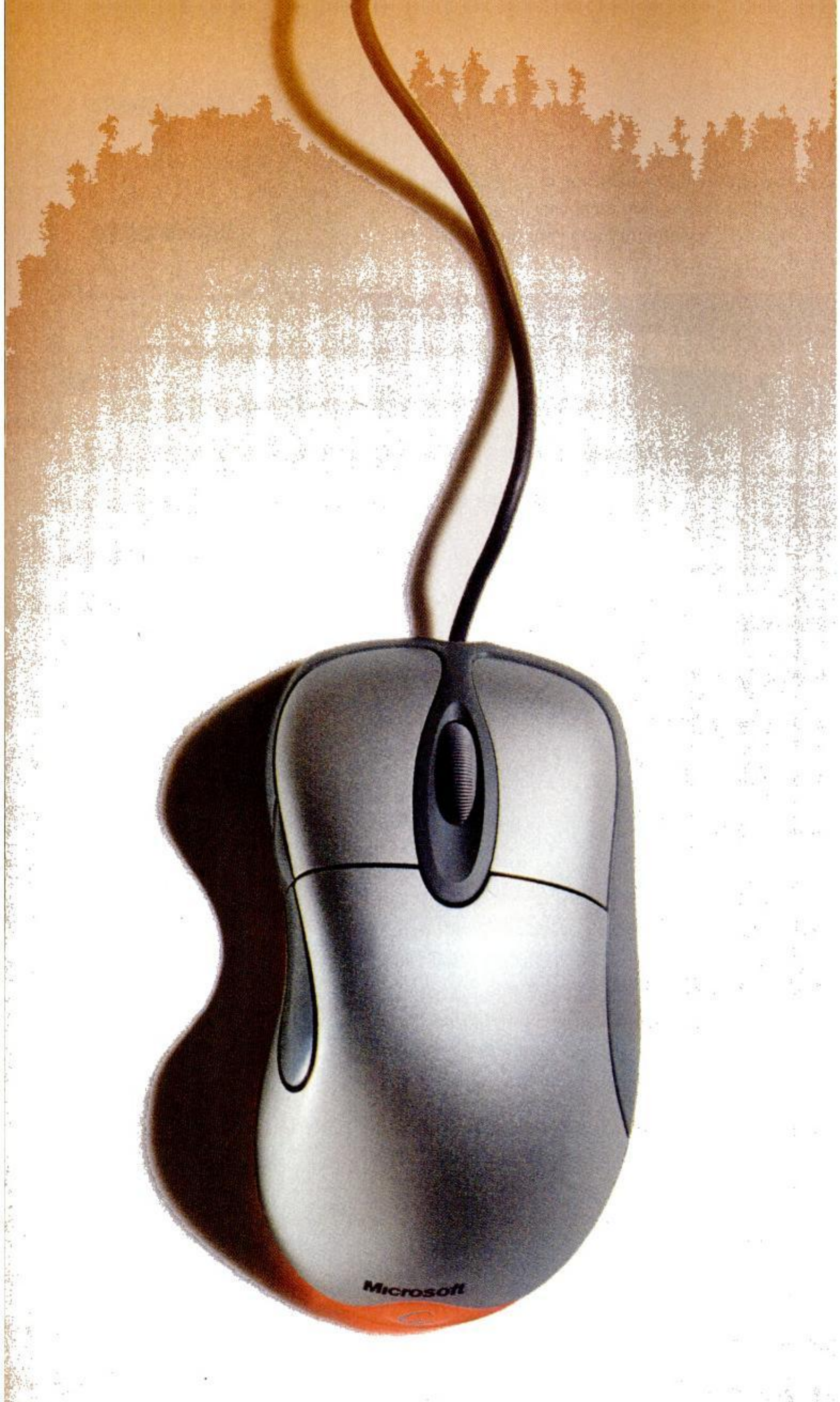
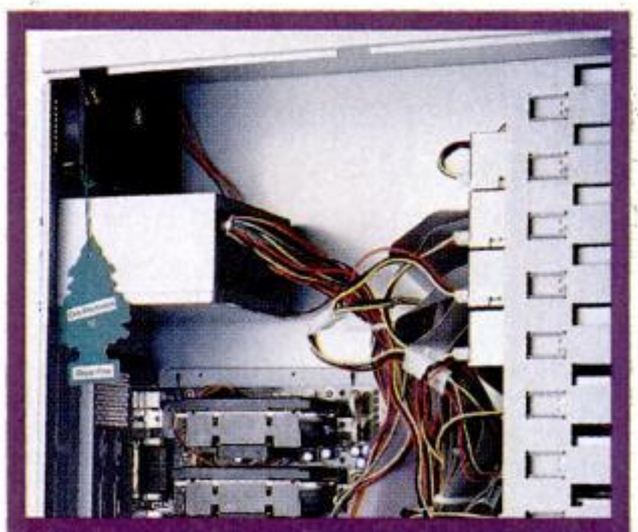


COMMPORT

Neutral Observations

If you check your tabulations on the total cost of the Dream Machine, you'll find a very important component was missed: The Pine Tree Air Freshener was not included in the final tally. "Incredible," you say. My words exactly. But there it was, hanging from the case. The only thing I hope is that no other reader is so damn anal retentive to have noticed.

—George Grothier



A very important component was missed: The Pine Tree Air Freshener was not included in the final tally.

In DM2000, you used the topmost drivebay for the Live! Drive breakout box. This is a mistake, as any cord plugged into the unit would drape down in front of all those friggin' CD trays. It would be more sensible and convenient in the bottom-most drive bay.

—Furn Huschl

I'm surprised that every single part in your Dream Machine is an off-the-shelf part; you used no custom parts of any kind, with the possible exception of the pre-release processors. You should have at least added some exotic cooling scheme and overclocked the thing! In fairness to the people who designed and built this system, I believe that, contrary to what Jon Phillips's Edword column would have us believe, there probably was a financial constraint on the designers.

—Richard Lindsay

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Reveal Your S-codes!

One small problem with your choice of Dream Machine CPUs: 1GHz Intel CPUs are not SMP-compliant (according to a file on the Intel web site). I don't know if this would prevent a system from running, but I would definitely be curious about what effect this could have. Unless, of course, your CPUs have different S-codes than the CPUs listed on the site. If you have somehow received newer processors, please let us know which S-codes you have.

—Mike Borduas

Senior Editor Gordon Mah Ung responds: We never said our machine was a real PC that actually worked—it's just a dream!

Just kidding. I repeat: *kidding!*

1GHz P-IIIs "don't run" in SMP mode just as P-PGA Celerons "don't run" in SMP mode. Intel's official decree is that you can't run P-PGA Celerons in SMP, but every Abit BP6 owner knows the truth to be otherwise. We have been successfully running the dual 1GHz Dream Machine for months without any problems beyond the normal Windows problems. Our CPUs are both coded SL4FP. A little bird told us that future 1GHz P-IIIs might officially support SMP.

Please consider that Intel has to be extremely conservative about what it publishes. If the company certifies that a particular class of CPUs will run in SMP mode, all of the CPUs in that class have to perform to spec. It's possible that Intel isn't getting all of its 1GHz yields to run in SMP (no surprise there), thus it doesn't certify them. Also note that the Dream Machine's OR840 motherboard isn't qualified for speeds beyond 866MHz, but it nonetheless works just fine at 1GHz.

Not a Laughing Matter

I can't believe you referred to the Afro-American guy on page 18 of your October issue as a "spook." I hope for your sake that Jesse Jackson and Al Sharpton don't subscribe to your mag-

azine. That remark, even if made in jest, was in poor taste. What century were you born in?

—Marialice L. Novo

Editor-in-chief Jon Phillips replies: Thanks for your concern, Marialice, and rest assured that I did not use the word spook in a bigoted way. The word is also popular slang for "spy" or "secret agent," and I thought (incorrectly) that the word would be read in that context, given that the man in the photo (Associate Editor Geoff Visgilio) isn't African-American and is dressed in a trenchcoat, which is stereotypical spy garb. The photo's caption also makes reference to the "nuclear football," which is something that many a cold war spy would have liked to have gotten his hands on. I apologize for using an ambiguous word with such a loaded meaning.

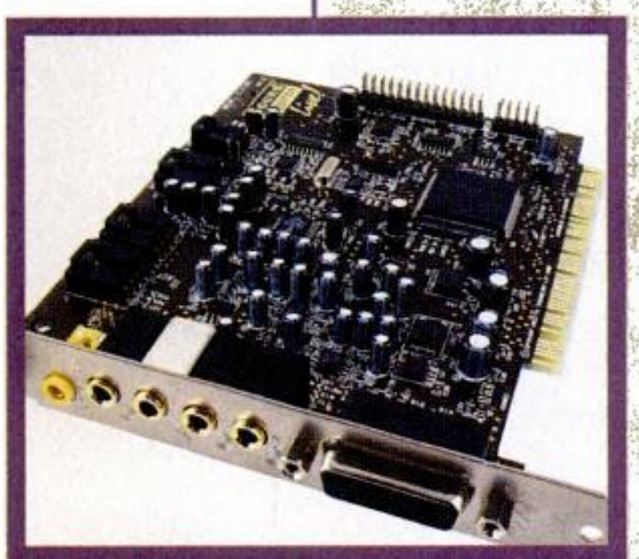
In Intel's Pocket?

I just read your October article on Duron vs. Celeron, and I must say, your mag hasn't changed one bit. I hope you don't call yourselves journalist because being in Intel's pocket is a disgusting shame! I have read *real* benchmarks that show a Duron smashing a Celeron, but every time I read any AMD vs. Intel article in your mag, you always give Intel some way out. If an AMD processor wins in a benchmark, you almost always make an excuse for the Intel processor losing. The Duron is clearly a better price/performance choice for a new PC builder. Does your mag even bother to print that Intel has problems producing high-end processors? Or that Intel had a CPU recall? As a matter of fact, does your mag print *anything* negative about Intel?

—Derrick Johnson

Editor-in-chief Jon Phillips replies: Derrick's e-mail name is "Athlonman," so we have to question *his* objectivity when it comes to CPU performance. Nonetheless, anytime anyone questions our fairness, we're concerned.

We stand by our Duron/Celeron benchmark results. Different technicians in different labs can receive different test results—that's the nature of benchmarking. Countless untold variables can affect final scores. It's also possible that the other test labs were using different motherboards, hard drives, etc., and this could explain the scoring discrepancies. We did our best to compare apples to apples, and we too were surprised that the Duron didn't perform much better than the Celeron. We'll soon conduct new tests to see if we can coax more performance from each CPU, and we'll print the results in the December issue.



The Sound Blaster Live! Platinum is great for gaming, but a mixed bag for serious analog recording.

We don't intend to "make excuses" for any CPU's performance, but we do feel a responsibility to explain why a particular CPU might do well or poorly in any given test. We also believe we have an established history of rightly praising AMD and rightly criticizing Intel. In December 1999, we named Athlon Processor of the Year. In May 2000, we celebrated AMD's 1GHz victory and chastised Intel for announcing a 1GHz CPU when the company clearly couldn't execute that goal with adequate yields. In August 2000, we ripped into Intel for disabling the cache in Coppermines and selling the CPUs as Celerons. In this issue, we report on Intel's recall of 1.13GHz Coppermines in our Watchdog department. And all regular readers know that we lambasted Intel for its 800-series chipset problems in many different issues of the magazine.

Derrick, we respect your criticism, but you should know that both AMD *and* Intel backers criticize our coverage—this even split tells us we're treating each CPU company fairly.

Let the Tech Reviews Begin!

Should *Maximum PC* stop reviewing game play and focus solely on underlying game technology? The answer to your question [posed in the October] issue is YES! I really like the idea of examining what's "under the hood" of games that we already know boast top-quality game play. Just as your late sister pub, *PC Accelerator*, reviewed games for their "whiz-bang" factor, I would expect *Maximum PC* to talk about the technology. This focus on technology will improve my understanding of what I need to think about when making those tough hardware upgrading decisions. But I encourage you not to review only the best-looking games. I'd like to hear about games that are technologically unusual—unusually bad, unusually elegant, unusually simple—in spite of their other qualities.

—Ed Pickart

You, Me, Be

Glad to see an article on SMP, which I feel is the future of computing, rather than 4GHz processors, but you made absolutely no mention of the most kick ass SMP operating system on the planet, BeOS. Shame on you!

—Gregg C. Alley

Editor-in-chief Jon Phillips replies: Many BeOS fanatics wrote in to complain about our oversight, and Gregg's letter was one of the more "civil" responses, to say the least. The intention of the October White Paper was to explain symmetric multi-processing from a hardware perspective, not to evangelize different OSes. Nonetheless, in explaining hardware issues, we did indeed mention WinNT, Linux, and MacOS in different examples, but failed to include BeOS. *This action was not part of a worldwide conspiracy to destroy BeOS as we know it!* We are currently developing a feature on alternative OSes, and BeOS will certainly be included in that article.

Recording Live! Music

I read the "PC Recording Studios" reviews in the October issue with great interest. As a gamer as well as a musician, however, I'd like to know how the three boards reviewed stack up against the Sound Blaster Live! Platinum for single-track recording quality.

—Scott Jernigan

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Soundcard reviewer Carl Lindemann replies: The Sound Blaster Live! Platinum is great for gaming, but a mixed bag for serious analog recording. The Live!'s break-out box has balanced connectors going into the unbalanced board—so it looks balanced, but isn't. This means the Live!'s signal is still subject to the RF pollution that the CPU, hard drive and power supply crank out. What's more, the Live!'s lower-quality DA/AD converters top out at 16-bit/48kHz recordings—not the 24/96 capabilities that the pro cards can handle.

On the plus side, the Live! uses the same core EMU10K1 chip that is found on EMU's serious recording cards. And unlike the audio-only cards, the Live! comes decked-out for gaming. You get a gameport and support for four speakers, plus Creative's *Multispeaker Surround & Environments* audio processing enhancements.

Noel is Leon Spelled Backwards

As a network administrator, I get a large number of calls complaining that "the Internet is slow." Try as I might, I can't track down the people with the Internet speed control. So I figured if anyone knew where the speed control was, it would be *Maximum PC*. Can you contact the speed regulators and ask them to turn up the Internet a little bit? My customers will appreciate it!

—Noel T. Cumberland

Editor-in-chief Jon Phillips replies: As magazine editors, we get a large number of e-mails requesting answers to absurdly unanswerable questions. Try as we might, we can't convince people that many problems are beyond *Maximum PC*'s purview. So we figured if anyone would understand our plight, it would be network administrator Noel T. Cumberland. Can you contact all the readers on our subscriber list and ask them to send us more reasonable questions? Our editors will appreciate it!

internet ▶ peer-to-peer computing

Next-Gen Napsterism

Peer-to-Peer File Trading Persists Despite Napster's Looming Demise

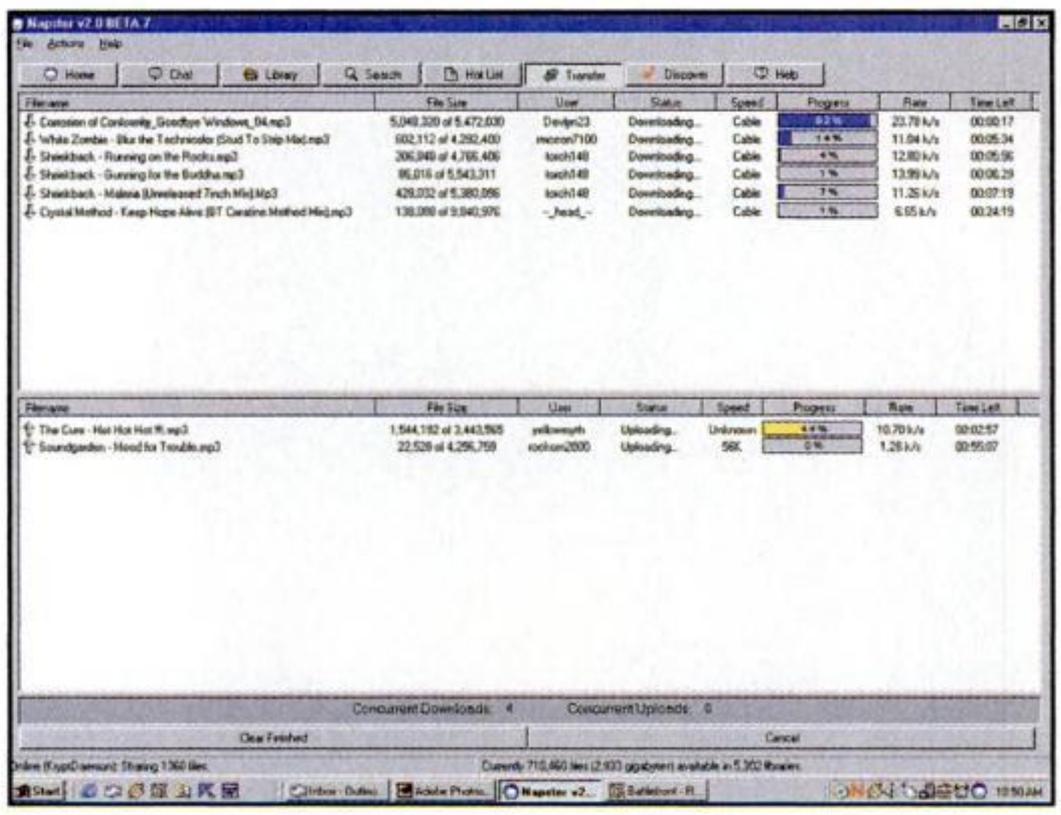
Echoing the old saying that the bands may die, but rock 'n' roll will live forever, *Napster* may die, but peer-to-peer file trading will survive.

This October, Napster Inc. faces a life-or-death legal battle with the music industry over its controversial MP3-swapping application. *Napster's* peer-to-peer file trading allows people to search the *Napster* database for songs in MP3 format. Once a song is located, the user downloads the file directly from another person's hard drive. The music industry's gripe with Napster Inc. is that the software is rarely used to trade legal MP3s distributed by artists and record companies. Instead, most transactions involve pirated MP3s.

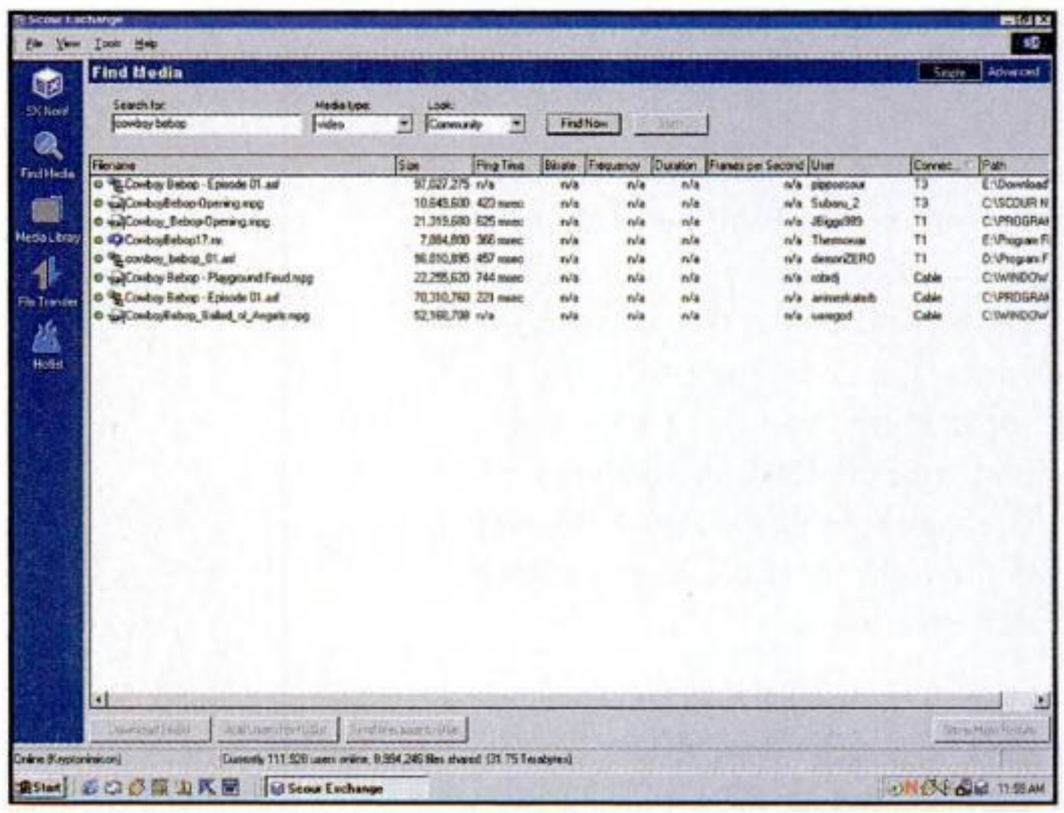
Though Napster Inc. itself isn't actually doing anything illegal, it does provide a forum where dirty deeds occur. Since "Napsterland" is where Johnny Law can put an instant end to any alleged crimes occurring—one injunction could shut down the servers and render the software useless—it's Napster Inc. that gets the most heat.

While it's possible that *Napster*-enabled trading might end very soon, the activity it has popularized is here to stay. New applications shuffle and index files via a pure peer-to-peer networking hierarchy. By eliminating the reliance on a centralized server that could conceivably be shut down, these *Napster* clones hope to wash their hands of the legal responsibility that's entangled Napster Inc.

Some of the clients we're about to introduce are pure peer-to-peer and some rely on a server. They may deal primarily in pirated goods, but there's no denying that they're nurturing a new revolution.



The best reason for using *Napster* is to download the "unreleased" music that you can't find anywhere else.



Not only can you find music on *Scour*, but you'll also find enough video and images to fill your anime hunger in you.

Scour

This aptly named application searches high and low for files from anyone who's using *Scour Exchange*. Scour.com has been in existence since long before *Napster* was even a sparkle in the eye of some college student. Since 1997, *Scour* has been combing users' hard drives for audio files. Scour execs say

SPIN CYCLE

This month's top stories broken down ▶

HEADLINE	NEWS	DETAILS	THE SPIN	OUR TAKE
Graphics Lawsuits Fly	Graphics company nVidia has filed a suit to stop the sale of rival 3dfx's products.	The suit alleges that 3dfx illegally used nVidia's patents to build its Voodoo3, 4, and 5 cards.	"nVidia's filing of a suit is clearly an attempt to force a settlement of our existing patent infringement lawsuit against nVidia," 3dfx said in response.	Despite 3dfx's contract with Micron PC and strong retail sales, nVidia is obviously trying to force the financially weak 3dfx to burn even more cash in legal fees.
Government Frags Gamemakers	According to federal regulators, the entertainment industry is actively marketing violent games, movies, and music to young people.	The Federal Trade Commission report accuses the entertainment industry of ignoring its own labeling systems in the pursuit of profit.	"Companies in the entertainment industry routinely undercut their own rating restrictions ...," the FTC says.	Parenting should be left to parents, not government regulators.

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they've been working with the RIAA to allow transfers of music through its software. Scour's *Exchange* app was designed from the ground up to be DMCA-compliant, which might account for the RIAA's willingness to talk shop.

Though *Scour* uses centralized servers like *Napster*, these servers communicate with one another to bring you the full spectrum of available users' files. *Napster*'s servers are blind to each other; this drawback spawned apps such as *Napigator*, which are designed to find information from server to server. *Scour* also brings the best of all things digital to your desktop—audio, video, and image files are available in spades. Want to find that new Hollywood movie that's still in the theaters? It's most likely already being swapped through *Scour*. Before long, you'll practically forget *Napster* even existed.

Gnutella

Shortly after *Napster* became popular, *Gnutella* hit the scene as an open-source app, which makes it virtually impossible to shut down. Even if *Gnutella*'s creators were hauled into court, executed, or exiled to Survivor Island, the Internet community could continue to download the source code, modify it, and compile it for use.

Couple this with the fact that *Gnutella* uses a pure peer-to-peer model that doesn't need a centralized server, and you have an unstoppable client. *Gnutella* was spawned by the Linux community, but it has a few weird Windows underpinnings, such as a funkified interface. *Gnutella* shares every kind of file imaginable, from movies to MP3s to Uncle Fester's Sweet Ocelot Stew recipe. As long as someone else has it and is using *Gnutella*, it can be yours. One pitfall of *Gnutella* is its performance; people used to swapping files with *Napster* should be prepared to wait longer when using *Gnutella*'s clumsy interface.

Hotline

Launched in 1996, Hotline has been cruising the file-sharing underbelly of the Internet for some time. The client works in much the same way as an FTP client does: Open the *Hotline Connect* client, connect to a Hotline server—which is actually another person's computer running the *Hotline* server app—and go through the rigmarole of finding the latest MPEG-4 movies or "pr0n."

However, just as in the days of downloading from FTP, you must sometimes deal with hard-to-find passwords and server overloads. Still, you do sometimes get access to the latest movies in very viewable formats.

Aimster

This app, based on the *AOL Instant Messenger* (*AIM*) protocol, works like many of the other apps here. However, since it's based on the *AIM* protocol, *Aimster* has to deal with some issues that *Napster* won't ever have to worry about—namely, the ire of one of the biggest companies in the world. *Aimster* is a true peer-to-peer app that piggybacks on AIM, the chat client that AOL users know and love. Available only to the 61 million registered AOL users, *Aimster* may be the best reason to use AOL. However, with the majority of AOL users on dialup, it's doubtful you can download a 150MB movie in a timely manner.

iMesh

iMesh's claim to fame is its "innovative patent-pending download" technology. *iMesh* allows multiple downloads, meaning that if the software determines that the same file exists in two locations, it will download from both locations at once to ensure a faster download. This is important, considering that it'll take you quite a while to actually connect to the iMesh servers.

However, once you're logged in, audio, video, software, images, and even print documents are available for the pilfering. And *iMesh* is peer-to-peer, so there are no *Napster*-esque legal concerns.

Shades of Robin Hood

The electronic data genie has been freed from its bottle; no matter what the RIAA, MPAA, or any other agency tries to do, most experts agree that it's too late to recapture the genie. The peer-to-peer model simply makes law enforcement too unwieldy. This may or may not be a good thing. Most people think of file transfers as a Robin Hood-ish means of putting music back into the hands of the artists who created it. But as time goes on, the artists whom Robin Hood is protecting may starve if no content protection scheme is put in to place to help feed them.

—Scott Tarr

DARE TO COMPARE: PEER-TO-PEER APPLICATIONS

CLIENT	URL	WHAT IT'S GOOD FOR
Napster	www.napster.com	MP3s
Scour	www.scour.com	Audio, video, images
Gnutella	gnutella.wego.com	Anything
Hotline	www.bigradh.com	Nearly anything
Aimster	www.aimster.com	MP3s
iMesh	www.imesh.com	Audio, video, images, software

to the pertinent details.

HEADLINE	NEWS	DETAILS	THE SPIN	OUR TAKE
MP3.com Pays for Music	A federal judge has ruled that MP3.com violated copyright laws with a service that lets people access MP3s from albums they own.	MP3 must pay Universal Music Group $25,000 per CD that it made available to its customers with its My.MP3.com service.	"We believe that everyone should have the right to listen to the music they purchase, even if it's on the Internet," says MP3.com.	The record industry wins a small battle in a war it's bound to lose.
Intel to Subsidize P4, Rambus	Intel will pay manufacturers rebates for every system sold that contains both a P4 and RDRAM.	OEMs could get $70 for every P4 PC sold this year with Direct RDRAM, according to InQuest research. Next the rebate drops to $60.	Intel wants to ensure "ramp up" of the Pentium 4 when it's introduced.	Intel is deathly afraid that the price of RDRAM will tank Pentium 4 sales, so it's crafted a payoff for vendors who use it.

For definitions of Terminator words, check out the Terminator online at www.maximumpc.com.

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trends ▶ PC industry

Vendors Dropping Like Flies

Spate of Manufacturer Deaths Doesn't Mean PC's Demise Is Upon Us

It's been a banner 12 months for PC failures. In April, soundcard maker Aureal filed for bankruptcy and shut down. Then, this August, the owner of PC companies CyberMax, Quantex, Pionex, and Inteva filed for bankruptcy. These high-profile tanks follow the recent demise of Hi-Val, Crossline, Microworkz, Smart and Friendly, Number 9, and Hercules.

While the death toll has some PC lovers fearing that the end is nigh, industry observers say there's no apocalypse on the horizon. Rather, the PC industry is maturing before our very eyes. Those who can move quickly will survive. Those who can't will end up like Quantex, CyberMax, Pionex, and Inteva. All four were sidelined when parent company Fountain Technologies claimed in August that it has run out of cash. Fountain won't be the last to go, says Roger Kay, an analyst for market research firm International Data Corporation.

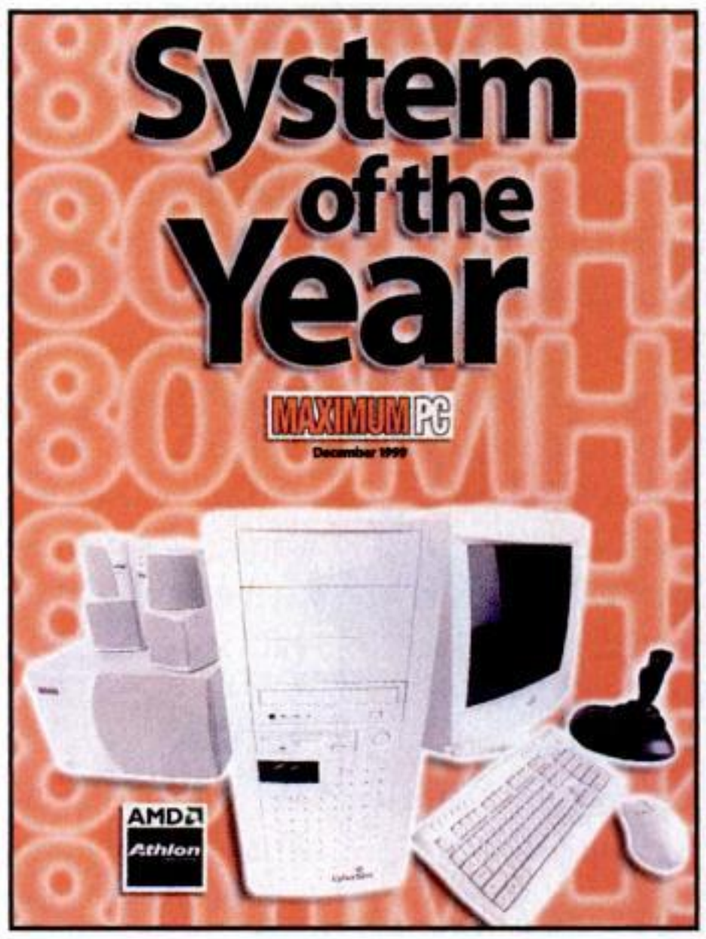
"There's been a squeeze on the second tier [such as Fountain] for about three years now," Kay said. "[Fountain] was underfinanced just enough to be unable to fight a multi-front war."

"[Fountain] was underfinanced just enough to be unable to fight a multi-front war."

Who's doing the squeezing? It's the big boys of computing, such as Dell and Compaq. As these "first tier" companies grow even more aggressively into the entry-level market, second-tier companies such as Fountain and eMachines will have an increasingly difficult time making ends meet.

While those not sufficiently nimble to sidestep the charging behemoths may get stomped on, many small PC vendors will survive, analysts say. It's the companies with a niche, such as Alienware and Falcon Northwest, that will flourish.

Of course, running a well-organized, well-funded company is equally important. Microworkz simply had a bad business model built on selling PCs for a loss, and Smart and Friendly tanked after an accounting problem spooked its investors. Crossline's demise was so mysterious that Los Angeles Sheriff's Department fraud detectives are still poking around the carcass of the company.



Cybermax pimped *Maximum PC*'s name in its ads, but that wasn't enough to bolster the company.

Hercules and Number 9 shorted out because both had long given up on developing their own technology and didn't have the marketing muscle to compete with companies such as Creative Labs. Hercules' name was purchased by peripheral maker Guillemot, which now hawks videocards under the famous Hercules name. Number 9 was gobbled up by S3, which it then combined with its Diamond Multimedia acquisition. S3 has since experienced an identity crisis and shipped the whole operation to VIA Technologies.

Hi-Val, while popular with power users, never quite achieved critical mass as a brand name. In addition, it suffered support and rebate fulfillment problems. Hi-Val was put up on the block and will reemerge under new ownership.

In Aureal's case, it may have been an old rivalry that killed the company, more so than lack of demand. In its final days, Aureal's add-in soundcards remained hot properties and the company still had a number of key accounts with big PC makers. Insiders told *Maximum PC* that Aureal burned through cash on an Internet audio technology and self-tuning speakers that never paid off. But what finally put the nail in Aureal's coffin may have been its costly patent suit with long-time rival Creative Labs. Though Aureal eventually won, the company racked up millions in legal fees. When the cash ran dry, Aureal's executive team resigned and the company filed for bankruptcy.

At press time, both Guillemot and Creative Labs were bidding for the remains of Aureal, with Creative Labs reportedly winning the bid. Creative Labs' officials declined to comment on reports. If Creative did win the bid, it's unlikely the company will introduce Aureal's highly-anticipated SQ3500 card.

Steve Koenig, a hardware analyst with PC Data, says some companies are simply the victims of technological evolution. Two years ago, it seemed as though every removable storage company bit the dust; SyQuest, Avatar and Nomai were among the deceased. But those deaths bore new life into the optical storage market, Koenig says, and the newcomers are expected to prosper. The death of Fountain and its four PC companies, as well as the rest of the recent casualties, may make room for others in their respective markets to emerge.

—Gordon Mah Ung

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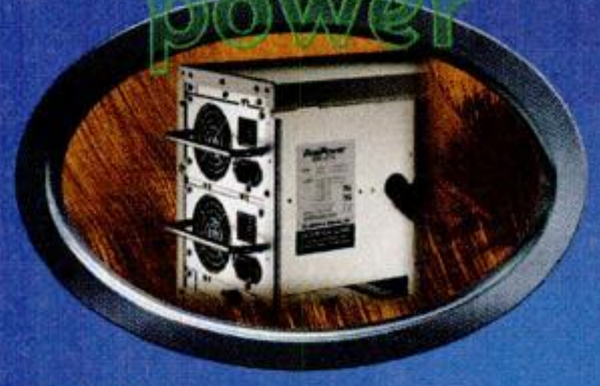

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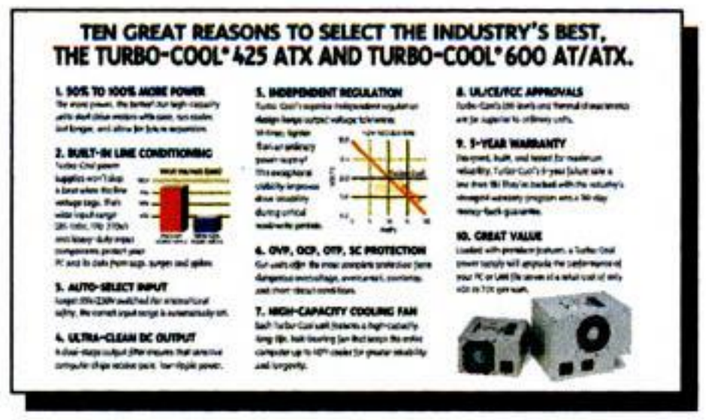
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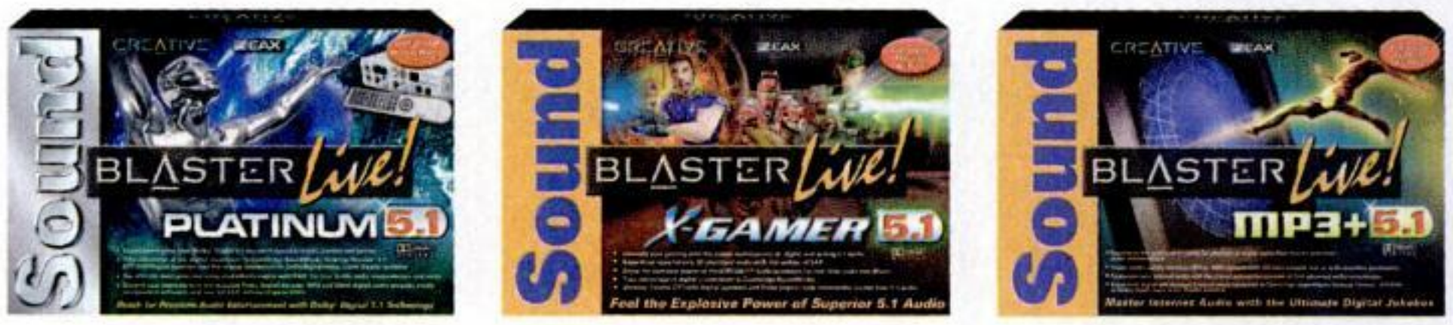

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ILLUSTRATION BY SCOTT LAUMANN

Maximum PC takes a bite out of bad service and gear

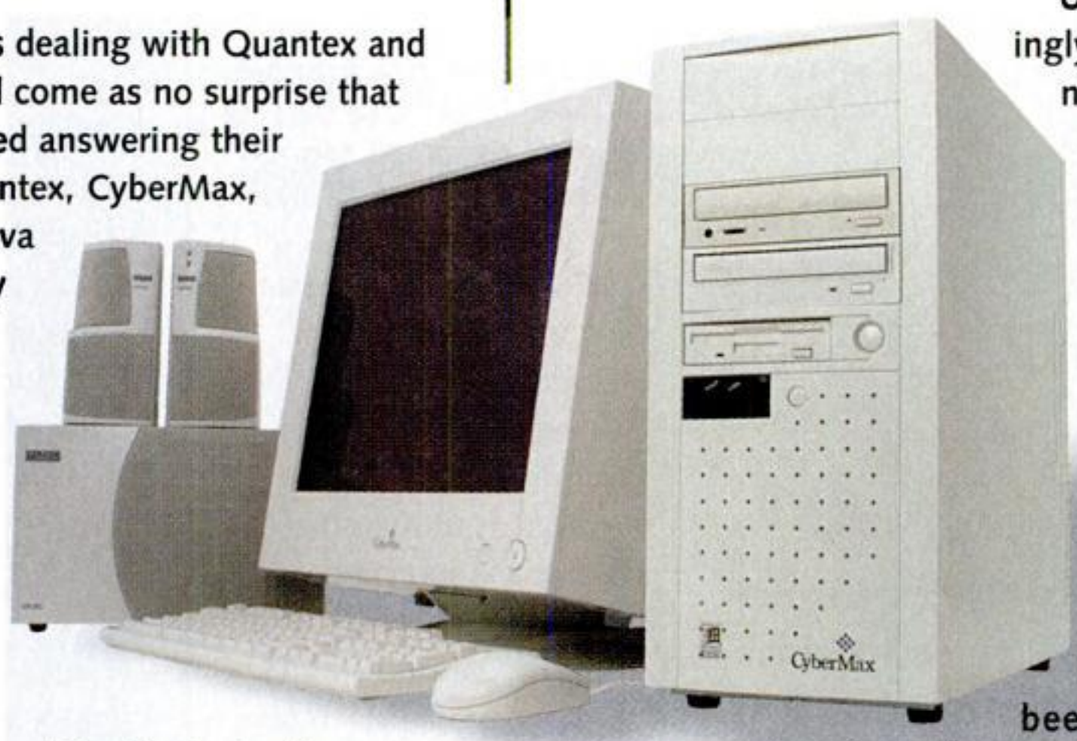
WATCHDOG

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing **Watchdog @maximumpc.com**. The Dog promises to get to as many letters as possible, but only has four paws to work with.

QUANTEX AND CYBERMAX, X-ED OUT?

For those who've spent months dealing with Quantex and **CyberMax headaches, it should** come as no surprise that **the two companies have stopped** answering their **phones altogether. In fact, Quantex**, CyberMax, **and PC makers Pionex and Inteva appear to have been fragged by the bankruptcy of their parent company, Fountain Technologies.**

On August 10, Fountain Technologies filed for Chapter 11 bankruptcy protection in New York City, citing lack of cash. Fountain claims it has some $80 million in debt and about $18 million in assets.



Despite kudos from *Maximum PC* and other magazines, CyberMax and three of its sister companies may be gone for good.

Despite the companies' claims (at press time) that they're still operating, none are answering the phones—but that's not a new situation. For months, customers of Quantex and CyberMax have complained of increasingly poor service.

"I ordered a CyberMax PC in May. By the time I picked it up a month later, I had been through a hell that I hope few of your readers ever experience," wrote John Fishman, who purchased a system after reading glorious reviews of an Athlon CyberMax in the pages of *Maximum PC*. "My PC seems fine, as far as I can tell, but the ordeal I had to go through to get it on my desk was simply unbelievable. My hope is that you will find CyberMax's customer service to be not just plain poor, but also as condescending and uncaring as I did."

Reader Jeffrey Thier also had issues with CyberMax. After he was unable to confirm the price of his order, Thier repeatedly tried to contact CyberMax, with no success. "If this is how [CyberMax's] customer service department works, I certainly wouldn't recommend this company again," Thier said.

This isn't the first time CyberMax has received attention from The Dog. In December, CyberMax took a beating from readers over a sudden price increase in its systems. At the time, CyberMax's VP of sales, Bill Bisignano, blamed the Taiwan earthquake for the price increase. Bisignano was no longer talking when The Dog tried to contact him about the recent turn of events. Neither was anyone from Quantex, or from any of the other companies affiliated with Fountain.

M.T. Chang, president of Fountain Technologies, has also gone underground. His home phone number has been disconnected, and no forwarding number is available. Attempts by The Dog to have neighbors near Chang's posh New Jersey home ask him to return calls were also unsuccessful.

Underneath its seemingly simple PC busi**ness, Fountain has a** tangle of affiliations with other companies. In a motion intended to prevent Fountain from moving its bankruptcy filing to a New Jersey federal court, attorneys for its creditors allege that the company is "bleeding cash" in payroll even though the staff has already been trimmed.

Attorneys also allege that some shenanigans are going on with Fountain's vendors. To wit: "Virtually all of the **Debtor's sales are made to companies affiliated with it by common ownership, which companies sell the Debtor's products on the retail market and which companies have substantial debts to the Debtor; and, there is no secured creditor to monitor the Debtor's activities." In other words, attorneys for creditors are concerned that Fountain's assets are being mishandled.**

Adam Friedman, an attorney with Traub, Bonacquist and Fox, said that despite the problems, his firm hopes that Fountain, Quantex, and Cybermax will survive. "We hope to stabilize the company," Friedman told The Dog. Friedman's firm is representing unsecured creditors, which include normal folks who could lose out on their warranties.

"If this is how [CyberMax's] customer service department works, I certainly wouldn't recommend this company again."

Fountain and its companies have a pile of outstanding debt, including $13.2 million to Intel, $3.9 million to Microsoft, and $3.6 million to AMD. Cybermax even owes *Maximum PC*'s publishing company, Imagine Media, some $42,000 in unpaid ads. At press time, attorneys for the creditors were set to meet with Fountain officials in hopes of gauging its financial condition. Friedman said those owed money by CyberMax, Pionex, Quantex, or Inteva should file claims

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with the bankruptcy court. They might also consider filing claims for the value of their system warranties. While it's not known whether Fountain will have any money to repay, it doesn't hurt to get on the train.

Because the case is being moved from New York to a New Jersey bankruptcy court, The Dog doesn't have the address for filing claims. Friedman said his firm will accept claim forms and forward them to the court. Contact him at 212.476.4770, or send him e-mail at afriedman@tbfesq.com.

Updates on the Fountain implosion will be published here. Daily updates can be found at www.quantexsucks.org, along with information on the bankruptcy and horror stories from Fountain's customers.

Drivers for defunct Aims Lab can still be found on the web.

Another option you may want to consider is simply trashing the board and buying a new one that supports modern CPUs.

SUPERPOWER NO MORE

"It's almost certain that no one received the 1.13GHz Pentium IIIs because only a few were made and almost all were still in the hands of OEMs when the recall was issued."

DEAR DOG: I've been trying to find BIOS updates for my SuperPower P2BXA motherboard, but it seems as though the company has died. Its web site has been down for three months and no one responds to my e-mail. I've tried calling, too. I would just like to know where I can get some BIOS updates for my motherboard.

—Michael Rue

THE DOG RESPONDS: SuperPower appears to have pulled a vanishing act. At press time, its phone number in the U.S. was disconnected and its web site was down. While The Dog couldn't locate any U.S. public records on the company, a contact at Motherboards.org told us that SuperPower appears to have filed for bankruptcy. SuperPower, are you out there?

If you're really desperate for a BIOS update, you may want to contact Unicore at www.unicore.com. Unicore sells replacement BIOSes for a fee.

AIMS LAB DRIVERS

Remember defunct AIMS Lab? If you've been hurting for a driver for your AIMS Lab equipment, reader Tim Brauch wants you to know that a company called Dart Europe is now selling some AIMS Lab equipment (www.darteurope.com) and has the latest drivers available. Some drivers are also available at www.windrivers.com.

INTEL RECALLS PENTIUM IIIS

This recall is a minor one that should affect almost no one, but if you're one of the few people who received a 1.13GHz Pentium III before October, you may want to contact Intel, which has issued a recall for all 1.13GHz P-III CPUs. The company told The Dog that, in some instances, lock-ups and general unreliability resulted when the CPUs heated up. Intel didn't specify at what temperature the CPU sputtered out, but said it's recalling all of the CPUs just to be on the safe side.

Because only a few were made, it's unlikely that anyone reading this received the 1.13GHz Pentium IIIs. In fact, at the time of the recall, most of the CPUs were still in the hands of OEMs. But if you somehow got your hands on a 1.13GHz Pentium III before October of 2000, contact your vendor for guidance.

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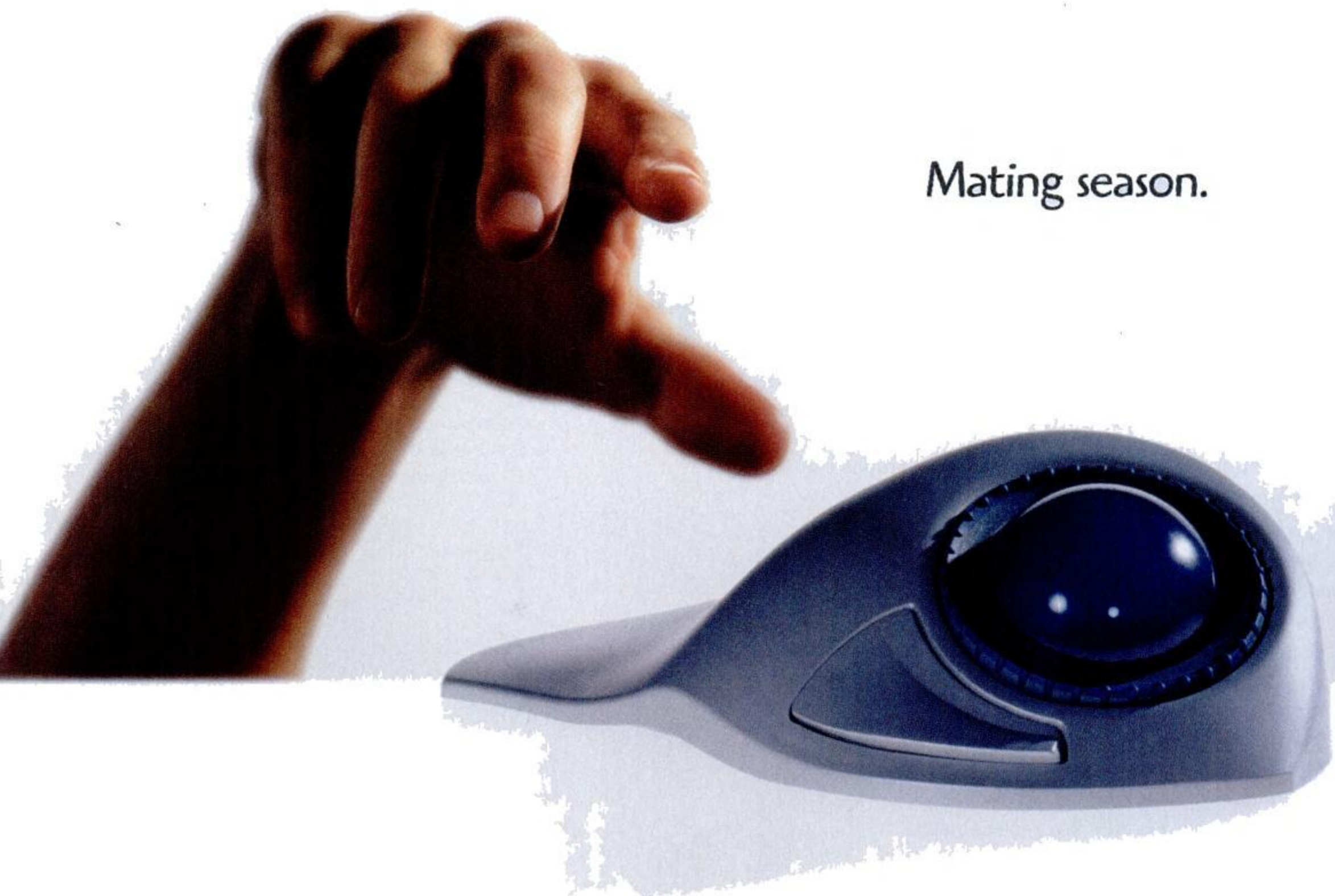

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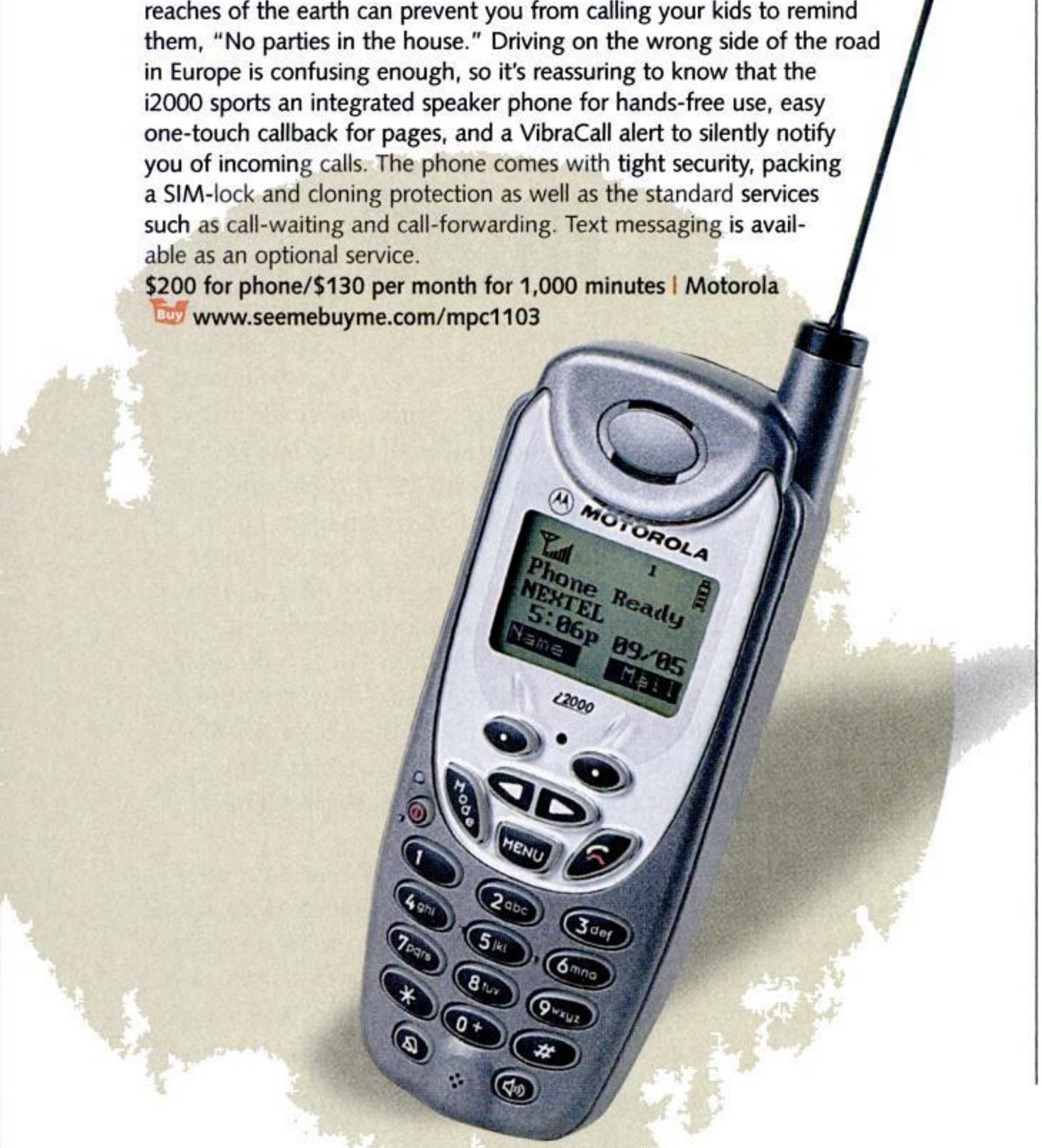

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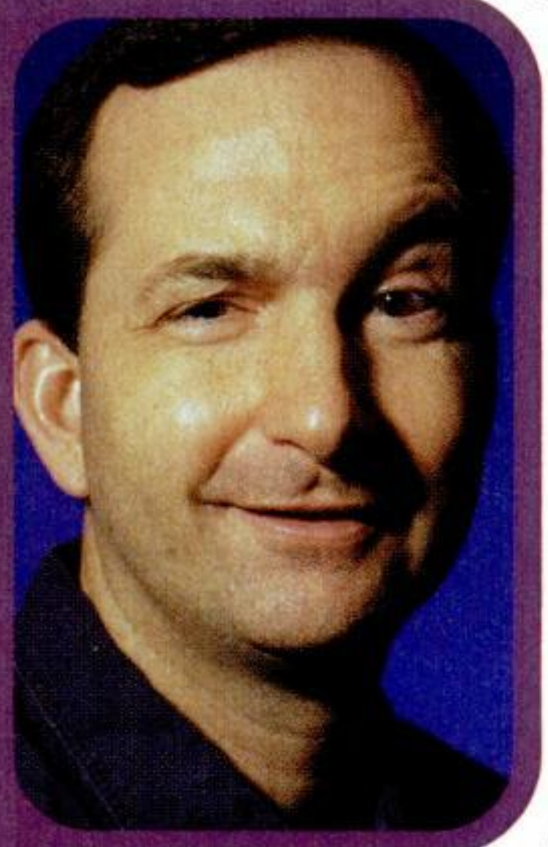
FAST FORWARD

Get ready for a rocket ride. Intel's first all-new x86 processor since the 1995 Pentium Pro is designed for neck-snapping clock speeds that will someday pull four or five Gs. That's "G" as in gigahertz, not gravity, although the processor might make you feel like you're zooming into orbit.



TOM HALFHILL
was senior editor at *Byte* magazine and is regarded as one of the most knowledgeable experts on processor technology in the industry. Contact him at **thalfhill@maximumpc.com**.

Everything about the Pentium 4 is designed for speed. That's smart, because most PC buyers look no further than a CPU's clock frequency when judging system performance. Technically knowledgeable users know that while clock frequency is a fair indicator of performance, it's not the only factor, and sometimes a chip with a slower clock speed outperforms a chip with a higher clock speed. But technically knowledgeable users make up a relatively small part of the market these days, so Intel's strategy is a no-brainer.

The big question is whether Intel has gone too far. Are Pentium 4 chips really as fast as their clock speeds imply? Or are they clever fakes, like "sports cars" that are really just overpriced coupes with racing stripes and nonfunctional spoilers? Rigorous benchmark testing will reveal the truth. We couldn't test the Pentium 4 for this issue, but we'll follow up with benchmarks next month.

Intel plans to ship the Pentium 4 in November at two speeds, 1.4GHz and 1.5GHz. Those are core frequencies, the internal speed of the CPU. The Pentium 4's system bus can run at 400MHz. So, right from the start, the Pentium 4 has a 33-percent higher core frequency and a 200-percent higher bus frequency than the fastest Pentium III (1.13GHz core, 133MHz bus). The Pentium 4's peak bus frequency is 100 percent faster than AMD's Athlon (currently 200MHz). Intel won't say how fast the Pentium 4 will eventually run, but the core is easily capable of hitting 3GHz—and 4GHz looks realistic, too. It wouldn't surprise me if the Pentium 4 core breaks 5GHz in a few years.

Such clock frequencies are in line with historical trends. The original Pentium appeared in 1993 at a top clock speed of 66MHz and eventually reached 300MHz—a 4.5x improvement. The Pentium Pro started at a top clock speed of 200MHz, and its direct descendant, the Pentium III, is currently at 1.13GHz—a 5.7x improvement. Intel faces some manufacturing challenges that will make it difficult to push the Pentium 4 to the same degree, but I think 5GHz is within reason.

Engineers describe the Pentium 4 as a "speed demon." That's a CPU designed to deliver the best performance at the highest possible clock frequency. A speed demon is the opposite of a "brainiac," a CPU designed to deliver the best performance at a lower clock frequency. Either approach is valid and has tradeoffs. Brainiacs tend to be more complex and expensive, while speed demons tend to be simpler but difficult to manufacture.

Not that anybody can accuse the Pentium 4 of being a simple chip. It has 42 million transistors, compared with 28 million in the Pentium III and 22 million in the Athlon. But in some ways it is simpler. In a radical departure from previous x86 generations, the Pentium 4 actually has fewer execution units than its predecessor. (Execution units are circuits that carry out program instructions.) While the Pentium III has three ALUs (arithmetic/logic units), the Pentium 4 has only two. Both processors have one FPU (floating-point unit). Comparisons with AMD's Athlon are tricky because it depends on how you count execution units, but the Athlon has three ALUs, three AGUs (address-generation units), and one FPU. At first glance, it appears that the Athlon and even the Pentium III are more sophisticated than the Pentium 4.

Don't jump to conclusions. The Pentium 4's ALUs do something never seen before in an x86 processor—they run at twice the chip's core frequency. For example, in the 1.5GHz Pentium 4, the ALUs run at 3GHz. They can execute twice as many instructions per clock cycle as normal ALUs, so two of them can do the work of four.

Although the Pentium 4's double-clocked ALUs aren't new technology, they are new to the x86 world. A separate clock signal drives the ALUs twice as fast as the rest of the core. It's similar to the way a system bus can run at a different (though slower) clock frequency than the core. To put it another way, Intel is overclocking part of the Pentium 4 at the factory to save you the trouble. It

Pentium 4: Under the Hood

INTEL'S LATEST CPU AIMS FOR NOSEBLEED CLOCK SPEEDS

Still, based on my early analysis, I think the Pentium 4 is a genuinely innovative x86 processor that will deliver its best performance where it matters most, in the multimedia-rich software that's redefining personal computing on the desktop and online. It will definitely give AMD's Athlon and future contenders plenty of competition.

Technically knowledgeable users make up a relatively small part of the market these days, so Intel's strategy is a no-brainer.

The Pentium 4 is considered the first all-new x86 proc from Intel since 1995 because the Pentium Pro, Pentium II, Pentium III, Celeron, and Xeon are all based on the same microarchitecture—the P6 core. Intel has made many improvements since 1995, adding such features as MMX, SSE, on-chip L2 cache, and faster system buses, but the Pentium 4 is a next-gen design that will be the foundation for many chips to come.

For definitions of Terminator words, check out the Terminator online at www.maximumpc.com.
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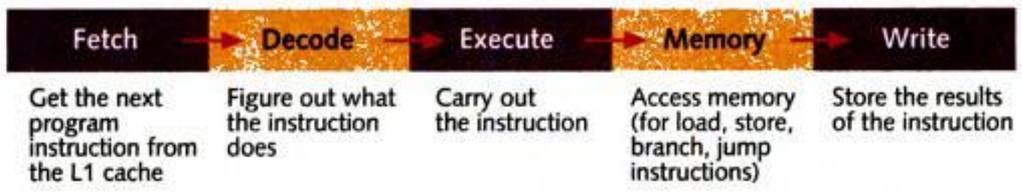
FAST FORWARD

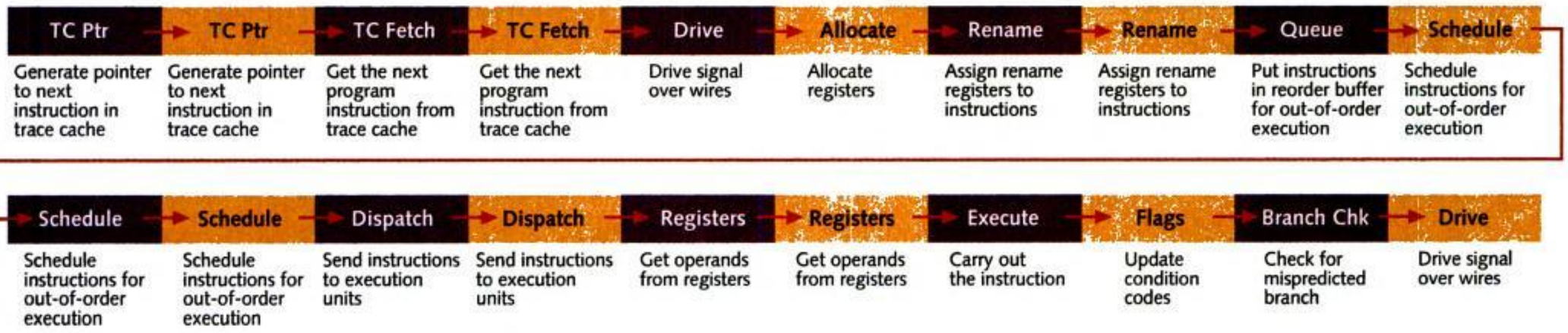
INTEL'S PIPELINE TO PERFORMANCE

Tom R. Halfhill for *Maximum PC*

A Classic Five-Stage Microprocessor



Pentium 4's 20-Stage "NetBurst"



Intel won't describe the Pentium 4's unprecedented 20-stage pipeline in detail, but we've figured out the most important features:

▶ The "trace cache" is an L1 cache, with the vital difference being that the Pentium 4 decodes x86 instructions before loading them into the cache. That's why this diagram has no decode stages—it assumes a best-case scenario of no cache misses. A miss would add at least three more stages for decoding.

▶ Notice how many operations require two or more stages (TC Pointer, TC Fetch, Rename, Schedule, Dispatch, and Register Access). By dividing those operations into multiple stages, the Pentium 4 can run at much higher clock speeds.

▶ Note the two Drive stages. They give the CPU time to drive electrical signals through its circuits. The Pentium 4 is the first CPU we've seen that has stages to handle wire delays.

▶ The Pentium 4 doesn't check for mispredicted branches until the next-to-last stage. That means it pays a huge performance penalty (at least 19 clock cycles) if it guesses wrong.

▶ This diagram shows no writeback stage—a critical function. Obviously, the CPU must write the instruction results back into the registers. Add that missing stage, plus the three or four decode stages required after a cache miss, and the NetBurst pipeline might be 25 stages long!

works because the circuits in the Pentium 4's ALUs aren't the critical path—the bottleneck that limits the whole core from running at the same higher frequency. Some RISC processors have used this technique for years. One tradeoff in the Pentium 4 is that the ALUs can execute only a subset of simple program instructions at the double frequency. Complex instructions execute at the normal speed.

Another surprising feature of the Pentium 4 is the deepest execution pipeline ever seen in an x86 processor. A pipeline is like a factory assembly line; it breaks down the execution of a program instruction into multiple stages. The Pentium 4's pipelines are an astonishing 20 stages long, compared with 12 stages in the Pentium III, 10 stages in the Athlon, and five stages in the original Pentium. In fact, I've never seen a microprocessor with a pipeline as long as the Pentium 4's.

Intel calls it "hyperpipelining," and this isn't just hype. By breaking down execution into more and simpler stages, a deeply pipelined processor eliminates some of the bottlenecks that limit the chip's clock frequency. Of course, it doesn't eliminate all the bottlenecks. But in layman's terms, this sucker is designed to scream.

One tradeoff of the deeper pipeline is a bigger penalty when a branch instruction redirects the flow of execution. For instance, when a dialog box with "OK" and "Cancel" buttons appears on the screen, it represents a branch in the program. Depending on which button you click, the program carries out different instructions. Deeply pipelined processors pay a greater branch penalty because they have to flush more unused instructions out of the pipeline. To compensate, Intel claims the Pentium 4 is better at predicting branches than the Pentium III, partly because it keeps track of eight times as many branch targets.

Another speedy feature of the Pentium 4 is a trace cache instead of a normal L1 cache. Unlike all other x86 processors, the Pentium 4 decodes program instructions before loading them into the L1 cache. There isn't room here for a full technical explanation, but the trace cache allows the pipeline to run faster and helps minimize the impact of branches. For now, Intel isn't divulging the exact size of the trace cache, but I estimate it's effectively twice as large as the Pentium III's instruction cache.

The Pentium 4 also has 144 new SSE2 instructions for multimedia and floating-point tasks, including some instructions that handle data in 128-bit chunks. In contrast, the Pentium III and Athlon typically handle multimedia and floating-point data in 64-bit chunks. That means the Pentium 4 can do twice as much work with a single SSE2 instruction as the Pentium III and Athlon, effectively doubling the capacity of its FPU and MMX units. We predicted this extension after Intel announced SSE (see "A Chip Called Katmai," *Maximum PC*, February 99).

SSE2 should have a huge impact on 3D-graphics programs, which draw objects on the screen by manipulating 32-bit floating-point numbers. The Pentium 4 can handle four 32-bit numbers with a single SSE2 instruction. The Pentium III and Athlon would need two instructions to do the same thing.

What does all this mean? I think the Pentium 4 will be a scorcher when running multimedia-rich software, because SSE2 and deep pipelining favor those data-intensive tasks. Everyday programs like Microsoft *Word* and *Excel* probably won't show as much improvement because they are more instruction-intensive and branch more frequently. But I think Intel is striking the right balance. Everyday software already runs fast enough on a 1.5GHz processor—or, for that matter, on a 500MHz processor. Most people who will splurge on a Pentium 4 want better performance with demanding graphics and audio software. That's the future of personal computing, and that's where Intel is going with the Pentium 4. ✹

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▶ THE SCOOP FROM A MAJOR PLAYER

GAME THEORY

Sports Goes Multiplayer

GAME COMPANIES ARE FINALLY TAPPING THE POTENTIAL OF ONLINE SPORTS

Sports games don't get much attention from the PC press, myself included. In a search of some 60 installments of this column, I didn't find a single one dedicated to sports sims. They lack the sex appeal of a good shooter and the addictiveness of a solid RTS. They're always just *there*, doing their work quite well and with little fanfare. Another year, another *Madden*, *FIFA*, or *Links*, with some new stats and marginal graphical improvements.

That may change soon, as sports take the plunge into the massively multiplayer arena, the last gaming frontier where PC holds utter dominance. Internet gaming has been driven by action and RPGs, with some space left over for strategy games. It's resisted sports games despite some game tries. Accolade's ambitious Jack Nicklaus Online Tour, based upon the criminally neglected *Nicklaus* golf games, attempted to create a venue for Internet competition among golfers, complete with actual prizes and spectators. The online effort fizzled out due to poor sales of the game, but the concepts and structures were rock-solid.

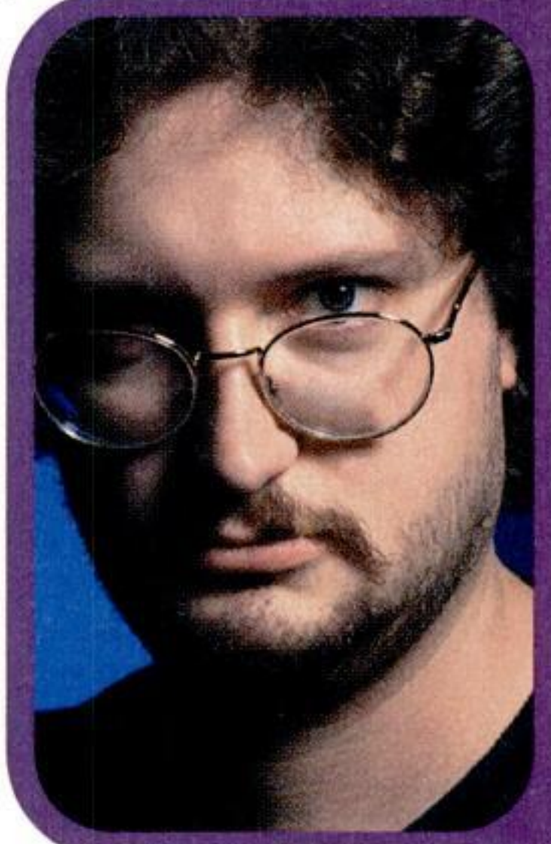
The time is right for sports to claim their rightful place in the MP realm. EA.com, Sega.net (for its Dreamcast game *NFL2K1*), and even Microsoft will likely lead the way. If done correctly, few things could have such widespread appeal, since fantasy sports leagues are a consistent draw for nongamers. While games such as *Links*, *Madden*, and *High Heat* have been offering some limited online play, more expansive and ambitious plans are in the works.

EA started getting more serious about sports MP last year, with one-on-one football contests in *Madden 2000*. The upcoming *Madden NFL 2001* takes this to the next natural level with customized leagues of up to 31 teams, with free agents, trades, college drafts, and contracts. More full-featured lobbies enable captains to hook up, chat, scan entries for possible opponents, and participate in ranked games. EA.com launched in October with what it termed its "first wave" of content. This is light stuff: quick mini-games and aged classics *Triple Play 96*, *FIFA 97*, and *NHL 97* played right off the server. These applets are unlikely to lure the hardcore gamers, and EA.com is fine with that for right now. "EA.com is all about online gaming for the masses, not the hardcore gamer," an EA.com rep recently told me. That's likely to change, since 2001 will see the full rollout of EA.com support of *NASCAR*, *Tiger Woods Golf*, *Triple Play*, *Knockout Kings*, and of course, *Madden*. These "premium" titles from the EA Sports line will include full MP support with matching and hosting.

High Heat, 3DO's baseball franchise, is already a leader in this area. *High Heat 2001* features a popular Commissioner mode hosted (with high traffic) by Zone and MPlayer. League play in *2001* works with one player taking on the role of commissioner, supporting 30 teams by sending out e-mails to individuals. The process is extremely cumbersome, but it's set to improve in version *2002*, due next spring. This next step automates a great deal of the commissioner's duties, making seasons and trades much easier to manage. Auto-HTML functions make posting standings much easier, and a Save/Load option for trades enables each of the thirty team owners to pick players. Within each league, players may select other teams to play against in either a simmed game or a realtime live arcade game.

In the realm of golf, Microsoft has been doing pretty well with *Links LS 2000*, which is also slated to get some online gameplay improvements. One-on-one play, already a pretty good draw on the Zone, is going to be given a speed increase with asynchronous play, so you don't have to wait for the other guy to go. More effort is also going toward making online tournaments more effective by integrating tournament options into the software rather than leaving them on the Zone servers. Since MS has been running tournaments for prizes (including some for cash) this may finally make competitive online golf appealing to the masses.

Fantasy sports leagues thrive on the web, with teams and standings tracked through simple e-mails and web text. Game manufacturers are finally getting wise to this market, and the multiplayer hooks for next year's sports titles will make current web-based fantasy leagues the equivalent of the text parser. Online RPGs and action games appeal, by their more complex nature, to people familiar with games. Online sports gaming, however, will draw from the mainstream and may actually create a surprising new area of growth for massively multiplayer gaming.



T. LIAM MCDONALD is a veteran gamer and game writer. His reviews appear regularly in *PC Gamer* and other publications. Write him at **tmcdonald@maximumpc.com**.

Random Thoughts

▶ For two years, some of the sharpest and funniest observations about gaming have come from Penny Arcade (**www.penny-arcade.com**) by Mike Krahulik and Jerry Holkins. I don't know why I never spread the joy before, but check it out and see if you don't wind up reading the whole archive.

▶ *Stunt Island* was a fascinating sim-cum-movie game from 1992 that all but vanished due to its uncategorizable nature. You could manipulate aircraft and hundreds of other props to create elaborate, edited mini-films with really crummy sorta-3D graphics. People are *still* using it to make movies (some an hour long); proof positive that after the ash settles from a nuclear winter someone will find and create a religion based on *Corridor 7*. If you don't believe me, visit the Stunt Island Film-Makers HQ at **www.sifahq.homepage.com**. There is something profoundly strange and charming about it, and it's proof that good games never die.

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How to build the...

Ultimate Home

Is that a VCR next to your TV? And what's that over there—a stack of stereo components? Looks like you're single-handedly keeping Circuit City in business. And where's your PC? Squirreled away in another room? Gah!

Newsflash: You don't need no stinking "consumer electronics." All you need is a properly outfitted PC. Oh, yes—we're going to show you how to make your PC the centerpiece of a kick ass home entertainment center. You want to watch DVDs? That's what your PC's DVD-ROM drive is for. Longing for a TiVO-like personal video recorder? Don't pay for the monthly service! All you need is a large hard drive and a TV tuner. Want to be the first on the block to play MP3s through your stereo? We'll show you how.

Why build instead of buy? Because with the right parts in place, your fully outfitted PC will beat the pants off the individual components that are for sale at your local electronics store. Plus, with our recommended config, you'll be able to play *Quake III* on a plasma display that's got more real estate than Rhode Island. Our PC also plays DVDs better than all but the most expensive dedicated players, has more storage space for TV show recording than any PVR, and holds more tunes than the biggest CD jukebox—all within the same box that was already housing pure PC power.

If you aren't a swingin' MP3 fiend, don't dig the PVR scene, or have no desire to watch DVD movies, don't sweat it—you can custom tailor our recommended config to deliver just the features that float your boat. And if your ability to feed your entertainment jones is governed mostly by your pocketbook, you'll be happy to know that almost every component you need for this project comes in both a "*Maximum PC* flavor" and a "mere mortal flavor." When you're ready to get the show on the road, our step-by-step instructions and detailed wiring scheme will guide you through the setup and configuration of your new toy.

Too many choices!

The system we've assembled contains nothing but the coolest gear around. However, you don't need to shell out $30,000 to build an awesome home entertainment PC, so don't let our excess deter you. Following are details on the parts we put into our entertainment powerhouse, but the shopping list on page 36 details some considerably cheaper—but still kick ass—alternatives.

Display Few people are willing to shell out $20,000 for the swank 50-inch Pioneer plasma display we chose. But can you fault us for getting our grimy mitts on a screen so awesome it made the *PC Gamer* editors green with envy every time they came within 30 feet of the Lab? We think not. With four video inputs—including composite and a DB-15 monitor jack—and a native resolution of 1280x760, the Pioneer is truly an all-purpose monitor.

Speakers Whether you favor Dolby Digital 5.1 or DTS (details on each are explained in the sidebar on page 41), when it comes to home theater, the only way to go is digital. You'll definitely want five speakers, a subwoofer, and some sort of box to decode the signals. We chose the Pioneer PDP and married it to the THX-certified speakers from the Klipsch Reference line.

MPEG decoder The question we most agonized over was: Should we trust the heart and soul of our system's DVD playback to a hardware-assisted software decoder or go with a dedicated hardware controller? After hours of testing, we settled on the Utobia DVD Motion card, simply because of its uncompromising anamorphic DVD output to our widescreen plasma display.

Videocard The battle over our home theater system's video-card was essentially over before it began. The ATI All-in-Wonder may as well have been custom-designed for this sort of work. With an integrated TV tuner, MPEG-2 capture and editing, and included PVR software, the All-in-Wonder perfectly fits the bill.

Soundcard With no less than three digital outputs, two digital inputs, and two four-channel analog audio outputs, the Sound Blaster Live! Platinum with LiveDrive 2 was the only logical choice. Next, please.

Storage The IBM 75GXP hard drive provides uncompromising performance for applications, the OS, and files that require a fast drive. It's also available in a variety of sizes. For storage of our digital media, we added a pair of Quantum lct10 low-speed, ultra-quiet drives—MP3s went on the 15GB version, and PVR duties were handled by the 40GB drive. Rounding out our rig's storage options is the Sanyo DVD/CD-RW combo drive. How convenient that it can both read DVDs and burn our favorite MP3s to CD.

Keyboards, mice, and remotes... Oh, my! We settled on an IR remote and an RF-based keyboard and mouse from Logitech—it met our normal mouse requirements, and the cool color scheme sold us. For those situations that don't require a full-sized mouse and keyboard, such as playing MP3s, we grabbed a Keyspan Digital Media Remote. The Digital Media Remote has a USB transceiver and a credit card-sized remote that's fully programmable.

Software We employed *MusicMatch Jukebox* because it comes complete with every function needed for MP3 jukebox duties, all of which are relatively self-evident from the moment you fire it up. For PVR purposes, we went with the PVR software that came bundled with the All-in-Wonder. And for DVD playback, the *Full Motion* software included with the Utobia card fit the bill nicely.

By Will Smith

PHOTOGRAPHY BY AARON LAUER

For definitions of Terminator words, check out the Terminator online at www.maximumpc.com.

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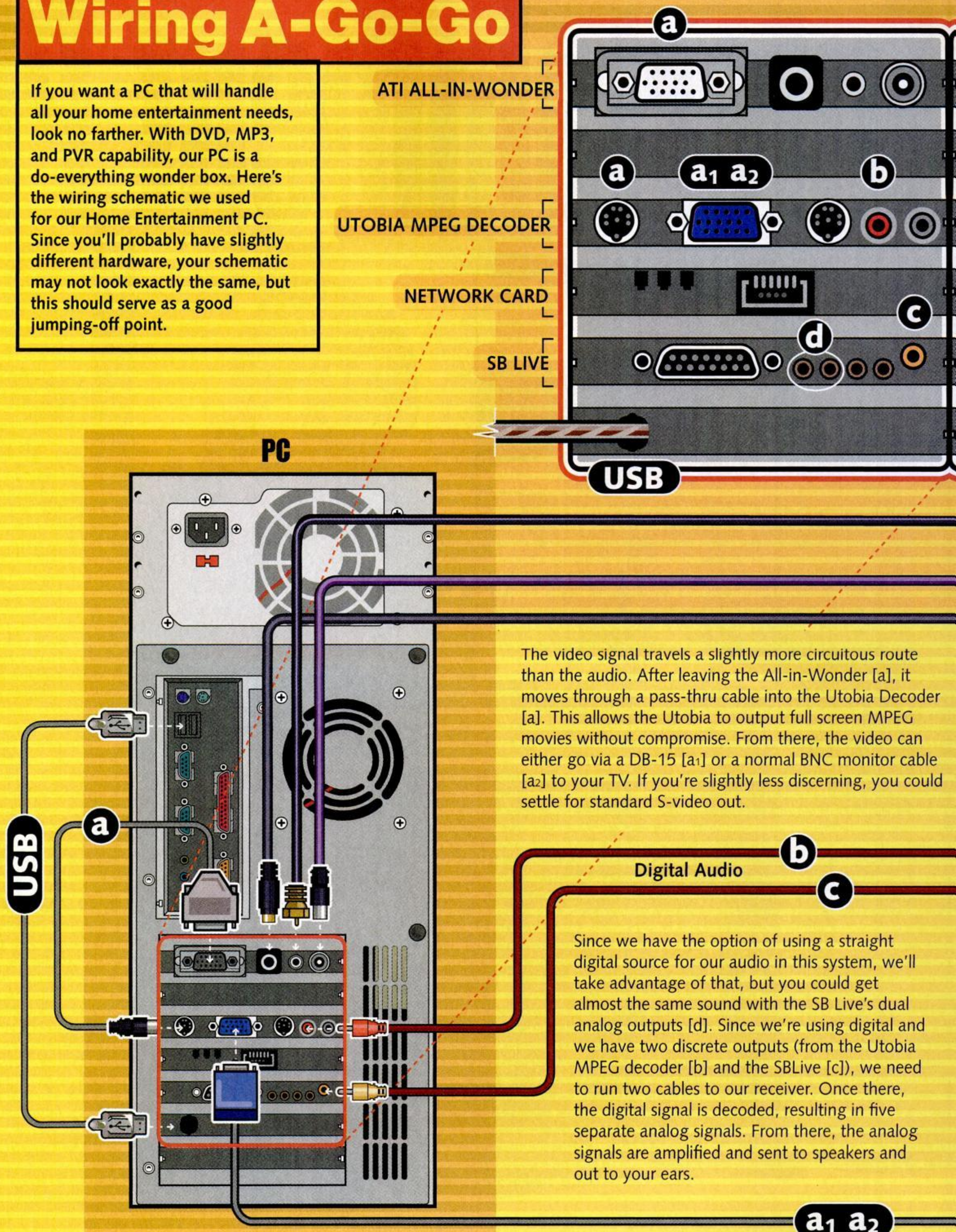
Entertainment PC

Wiring A-Go-Go

If you want a PC that will handle all your home entertainment needs, look no farther. With DVD, MP3, and PVR capability, our PC is a do-everything wonder box. Here's the wiring schematic we used for our Home Entertainment PC. Since you'll probably have slightly different hardware, your schematic may not look exactly the same, but this should serve as a good jumping-off point.



The video signal travels a slightly more circuitous route than the audio. After leaving the All-in-Wonder [a], it moves through a pass-thru cable into the Utobia Decoder [a]. This allows the Utobia to output full screen MPEG movies without compromise. From there, the video can either go via a DB-15 [a_1] or a normal BNC monitor cable [a_2] to your TV. If you're slightly less discerning, you could settle for standard S-video out.

Digital Audio

Since we have the option of using a straight digital source for our audio in this system, we'll take advantage of that, but you could get almost the same sound with the SB Live's dual analog outputs [d]. Since we're using digital and we have two discrete outputs (from the Utobia MPEG decoder [b] and the SBLive [c]), we need to run two cables to our receiver. Once there, the digital signal is decoded, resulting in five separate analog signals. From there, the analog signals are amplified and sent to speakers and out to your ears.

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ATI BREAKOUT BOX

VIDEO CAPTURE

TO CABLE BOX

RCA out

ATI S/PDIF out

STEREO RECEIVER

5.1 SURROUND SOUND SYSTEM

(Never at the same time)

OR

TELEVISION

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How to Build an Entertainment Powerhouse

Like most home-improvement projects, building your entertainment center will require a few common tools. You'll need a Phillips screwdriver and a tool that can cut metal (assuming you want to get fancy with a case-mounted USB hub). We used a standard Dremmel tool fitted with a metal-cutting blade. Wear safety goggles when you use this tool! If you're sick of beige, you'll also need some masking tape and a can of Rust-Oleum paint.

We're assuming you're outfitting a PC that you already own, but we'll walk you through the basic steps of configuring your rig for entertainment purposes. If you're building the bugger from scratch, check out **www.maximumpc.com/buildit** for tips. As for installing any additional hardware components (videocard, hard drives, etc.), do yourself a favor and use the instructions your hardware manufacturers have included with their gear. Expect to spend about two hours setting up all of the hardware and software. And don't forget to consult the wiring schematic on page 34.

Following is your shopping list for this project. You don't have to include every component here, just those that provide the options you want. Note that there are two listings for each component: a high-priced, top-of-the-line option, and a more modestly priced option that will still offer super-sweet performance.

Component	Bank-account breaker	Bank-account saver	Notes
Case	CoolerMaster ATC-100-MX, $300 (**www.coolermaster.com**)	Any ATX case	The ATC-100 doesn't ship with a power supply. We like the PC Power & Cooling Silencer 275 because it's very quiet.
Videocard	ATI All-in-Wonder, $300 (**www.ati.com**)	Voodoo3 3500 AGP, $180	The All-in-Wonder is the center of our system, performing PVR, vidcap, and even DVD decoding functions in a pinch.
MPEG-2 decoder	Utobia DVD Motion, $50 (**www.utobia.com**)	Software players, such as WinDVD, cost almost as much as hardware.	The MPEG decoder allows you to play anamorphic DVDs fullscreen on a widescreen display.
Sound	Sound Blaster Live! Platinum, $175 (**www.creativelabs.com**)	Aureal SuperQuad, $35	Digital sound is a must, and the SB Live! Platinum provides it aplenty.
Hard drives	IBM 75GXP (**www.ibm.com**), Quantum lct10 40GB and 15GB (**www.quantum.com**), $615 for all	Any hard drive with sufficient capacity	We recommend separate drives for video data, MP3 storage, and the OS and applications, to minimize fragmentation.
Optical storage	Samsung Combo SM-304B, $275 (**www.samsung.com**)	Stand-alone DVD, $50, or CD-RW, $200	The Samsung allows you to watch DVDs and burn MP3s to audio CDs in one convenient package. Nifty, eh?
Keyboard/mouse	Logitech Cordless Desktop Pro, $130 (**www.logitech.com**)	A wired keyboard and mouse with extension cord, $30	The Logitech works great, even with high-precision apps such as *Photoshop*.
USB hub	Belkin ExpressBus, about $30 (**www.belkin.com**)	Any USB hub that you can rig	We found this Belkin in the Lab, but any hub will do, as long as it's relatively easy to mount.
Monitor	Pioneer PDP-502MX, $20,000 (**www.pioneerusa.com**)	Princeton T-Series AR3.2T 32-inch monitor, $2,000, or any cheap 21-inch monitor, $650	Don't scrimp on your monitor; even a cheapy is better than a regular TV.
Speakers and receiver	Klipsch Reference RF-3 towers, $800/pair; Klipsch Reference RS-3 surrounds, $550/pair; Klipsch Synergy KSW-12 subwoofer, $499 (**www.klipsch.com**); Pioneer VSX-D509S, $435 (**www.pioneerusa.com**)	MidiLand S4 8200 Dolby Digital 5.1 computer speakers, $300	Good sound is vital to a proper home theater experience, so this isn't a place to be cheap. We like the Klipsch Reference series, but if you don't have the budget or the inclination to set up a full Klipsch rig, the MidiLands pack enough punch to still piss off your neighbors.
Software	*MusicMatch Jukebox* 5.0, $30 (**www.musicmatch.com**)	*RealJukebox Plus* 2, $30	*MusicMatch* recently added the ability to burn CDs directly from playlists, but unfortunately, as of press time, the app didn't support our Samsung combo drive.

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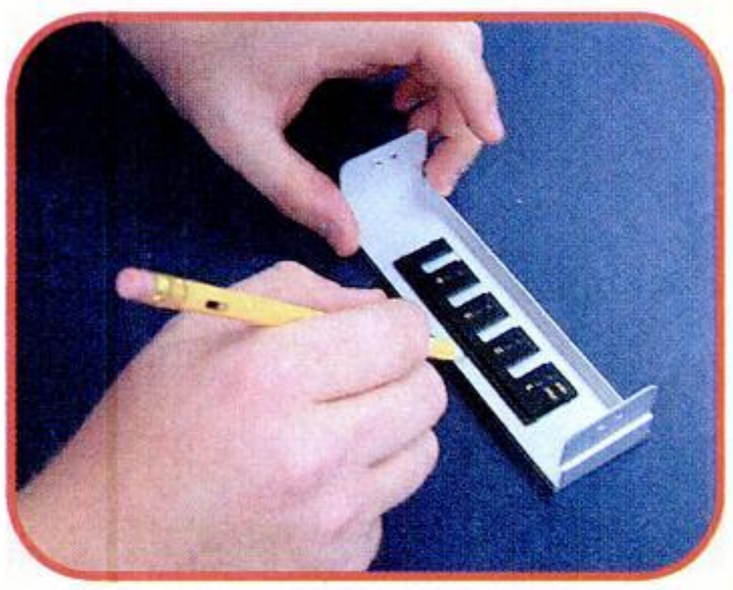
Got everything you need? Let's get crackin'. The first thing we're going to do is modify a few of the items on our shopping list in order to give our PC a few fat features and a nice, polished look.

The Hardware

Adding front-mounted USB Our Home Entertainment PC is a prime candidate for front-mounted USB ports. Do you really want to fumble around the back of the case every time you want to plug in USB gamepads or other peripherals? We grabbed our Belkin ExpressBus USB hub and whipped out the screwdriver. By removing four screws, we were able to open the plastic cover and get access to the innards of the hub. Inside, we found a circuit board surrounded by a metal emission shield. Since we live in utter fear of the FCC's roving interference detection squads, we didn't dare remove the shield.



Making the cut To add front USB ports, we needed to cut a hole someplace in the PC's front. Luckily, the 5.25-inch drive bay is about the perfect size. When we disassembled the USB hub, we saved the plastic front plate, which we painted the same silver as the DVD drive. After we made a paper template of the hub's front plate, we marked the drive bay cover using a pencil, to guide us on our cutting adventure. Be careful when you're making the cuts—those people who write the warnings about the dangers of cutting metal are not joking. Wear your safety goggles, tough guy.

To make the actual cut, we fired up our trusty Dremmel tool with a metal-cutting blade attached and went to work. We found that cutting from the front of the plate at an intermediate speed worked best, but your results may vary.

Get screwed To mount the hub in the case, we drilled four holes into the emission shield and ran four long screws through the CD-ROM mounting holes that were already drilled in the case. While this worked, we weren't completely pleased with the results. If you have a more workable suggestion, please e-mail Will Smith, our technical editor, at **will@maximumpc.com**. We'll print the best suggestion in an upcoming issue.

Display Options

Ditch your TV

Odds are that the TV currently sitting in your living room is based on technology developed in the 60s. That's right, your low-res TV is an anachronism, and because it renders computer text almost unreadable, it's a worst-case option for this project.

We knew from the start that choosing a display would be tough. How do you get fine enough resolution to read text, but enough screen real estate to watch movies with that movie-theater feel? You get an HDTV, that's how.

At the end of the day, an HDTV is essentially a big-ass monitor. It comes in a variety of resolutions, the most popular of which are 720p and 1080i. The 720-line resolution is a progressive (or non-interlaced) signal, while the 1080-line signal is interlaced. Unfortunately, many HDTVs lack an easy mechanism for getting video out to the display. Those with monitor inputs include the Pioneer PDP-502MX 50-inch plasma display and the Princeton T-Series AR3.2T 32-inch monitor. Any large monitor, such as the Sony FW900, will also work in your Home Entertainment PC.

Why go widescreen? HDTV pictures will most likely be broadcast in a widescreen format, with an aspect ratio of 16:9 (normal TV uses 4:3). For movie viewing, widescreen is vital. When you watch a widescreen movie on a standard 4:3 TV, black bars appear on either side of the image. When viewing a non-anamorphic DVD, about one-quarter of the available image is wasted drawing those black bars. An anamorphic DVD, however, uses all 480 lines for the image, and lets the DVD player generate the black bars for 4:3 TVs by removing (on the fly) every fourth line from the image. The real advantage comes when you have a 16:9 TV, which is able to use every available line of resolution.

We've also discovered that soon-to-be-released high-definition, rear-projection TVs generally look better than our plasma display. Black levels on the plasma displays can't compete with the crisp, clear blacks that a good CRT-based rear-projection TV provides. Also, DLP-based sets, out this fall, should offer better image quality at about half the price of plasma. (While we have seen DLPs in action at trade shows, none were available for sale at press time.)Regardless of what you buy, make sure it has the right inputs.

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Buy it for only
$1,149[2]

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Your ThinkPad i Series 1200 notebook will hit the road running with Microsoft's new operating system for the home and unlimited Lycos Internet service.[1]

Get ready for an unforgettable journey when you start up your affordable ThinkPad® i Series 1200 notebook, because Windows Me provides an enriched Internet experience[4] and makes everyday tasks easy. And with a built-in 56K[5] V.90 modem and unlimited Internet access from Lycos, you'll be jetting around the Web non-stop to get things done. You can even take the shortest route to your personalized home page and the information you need with one-touch Easy Launch buttons. Ready-to-use productivity tools[6] such as Lotus® SmartSuite® Millennium Edition let you get to work as soon as you unpack your ThinkPad notebook. Plus, you'll get outstanding service and support[7] with every IBM product.

The ThinkPad i Series 1200 includes:
Mobile Intel® Celeron™ processor 550MHz[8]
12.1" SVGA HPA display
32MB SDRAM • 5GB[9] HDD
24X-10X[10] CD-ROM
56K V.90 modem
Microsoft Windows Millennium Edition
Lotus SmartSuite Millennium Edition
Quicken 2000
Travel weight of 5.9 lbs.[11]
3 Easy Launch buttons
Plus, unlimited Internet service from Lycos[1]

NEW! Windows Millennium Edition

Microsoft® Windows® Me brings the richness and convenience of the digital world to your home.

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- create, edit and e-mail home movies with Windows Movie Maker
- use centralized Help and Support to use and maintain your system
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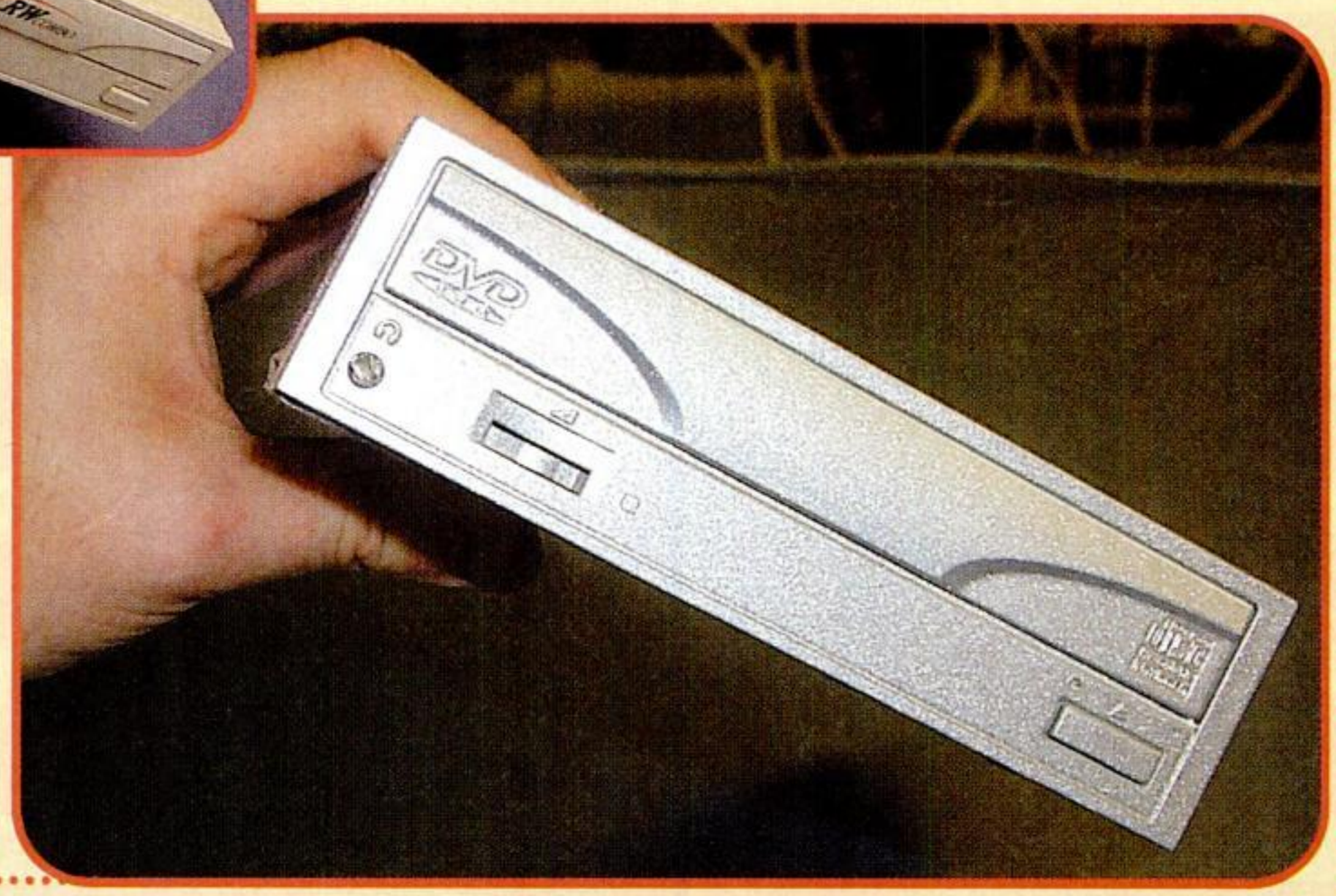
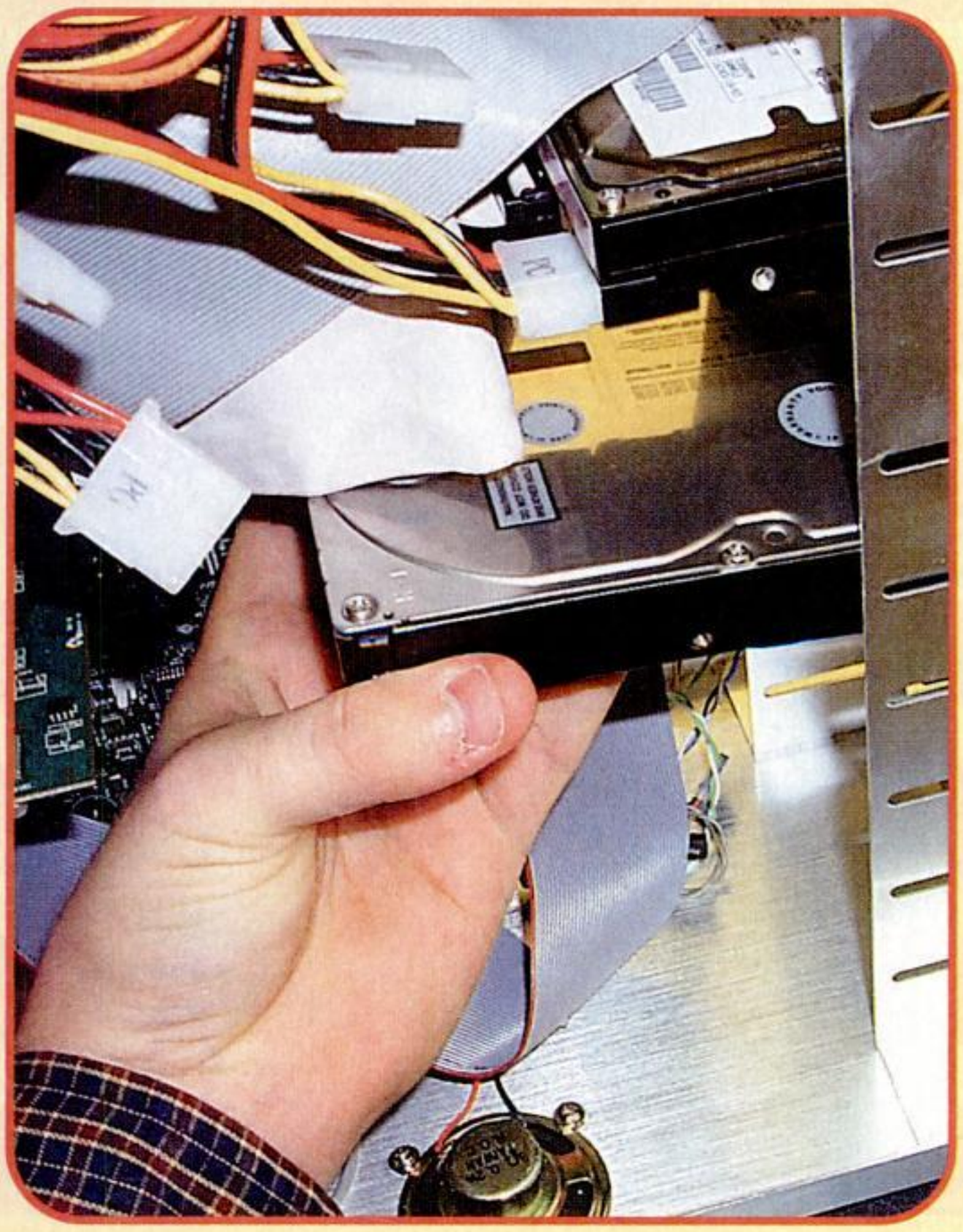
Beautifying the DVD/CD-RW drive We didn't want a single beige component sullying our beautiful brushed aluminum case, so we decided to paint our DVD/CD-RW combo drive silver. First, we masked all the parts of the drive that didn't need painting, such as the headphone jack, the emergency eject hole, and the activity light. Then we taped all around the edges of the faceplate and over any holes we could see on the side of the drive.



Detail with sparkles The painting itself took place in a well-ventilated area that we like to call the parking lot. We got optimal results by resting the drive on its rear end, holding the can of spray paint about six inches from the drive, and spraying light coats every minute or so until we were no longer able to see the logo on the front of the drive. After about 30 minutes, the paint was completely dry and we were in business.



Add all remaining ingredients It's time to add the rest of your theater components—the videocard, soundcard, MPEG-2 decoder, and any additional hard drives you intend to install. For details, see the instructions that came with your components.

So we could run a cable from the USB ports on the back of our case to the hub we buried in the system, we used the Dremmel to cut a notch out of an empty PCI slot cover. We're slaves to aesthetics...

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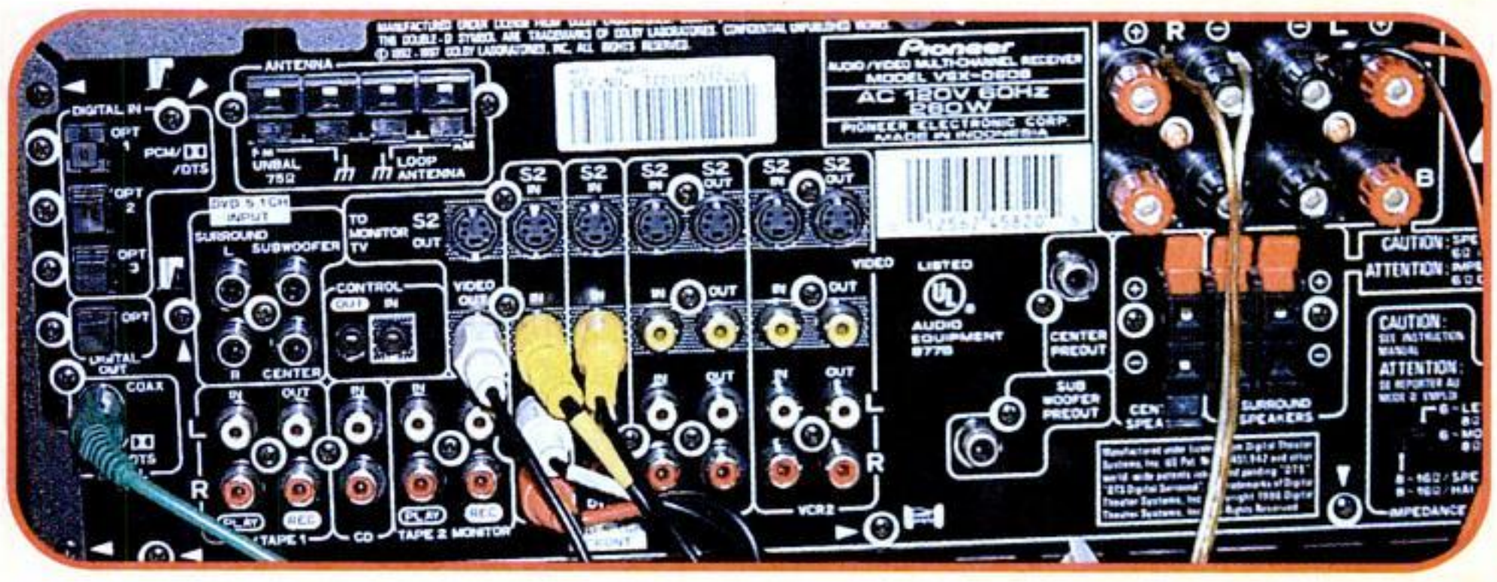
PC connections Depending on the components you've chosen, you'll get video to your display and sound to your speakers in different ways. Because our PC is the center of this endeavor, we'll start there.

Regardless of the type of display you've chosen, the signal will need to be routed from the All-in-Wonder to the Utobia DVD decoder, and from there to the monitor of your choice.

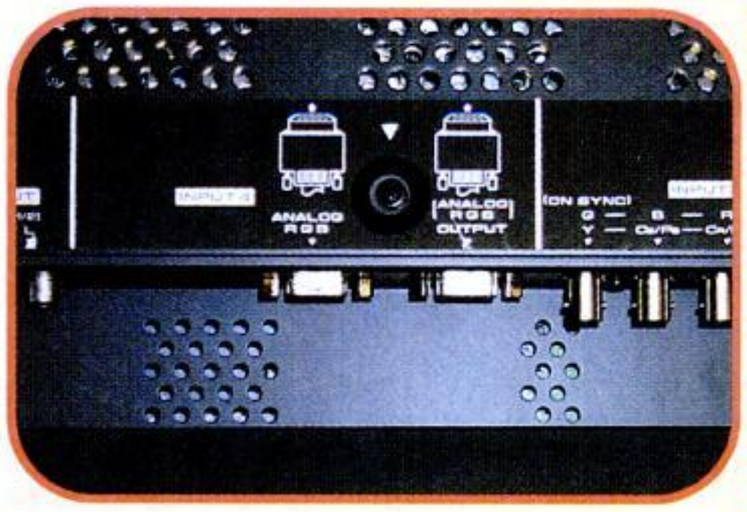
You'll pump sound out of your computer using either the two analog outputs, or one of the following digital outputs: the coaxial S/PDIF on the back of the soundcard, or the Toslink S/PDIF output on the LiveDrive 2. Be sure to use an optical output if you plan to use the MidiLands—we explain why in the next caption. Finally, plug a coaxial cable into the S/PDIF on the back of the Utobia card—that's what will carry the Dolby Digital and DTS signals embedded on the DVD to your sound system.



Receiver connections Next up is your sound rig. It's the trickiest connection, and how it's configured depends on the hardware you're using. If you've got a Dolby Digital amplifier with more than one digital input, you're in great shape—just run the two digital outputs from the back of the computer (the ones that come from the Utobia card and the SB Live!), connect the five Klipsch speakers according to their instructions, and you'll be good to go.

If you chose to get a self-contained DD5.1 rig like the MidiLands, your connections will be a little different. Be sure to use the optical output from the Sound Blaster Live! because the MidiLands have only one optical and one co-ax digital input.

Display connections Assuming you purchased an HDTV or monitor with a DB-15 input, you'll connect the TV exactly as you'd connect a normal monitor. Our Pioneer plasma display has a multitude of connections, including standard DB-15, S-video, a five BNC-component, three ColorStream Plus, and plain old RCA inputs. Unfortunately, most HDTVs have only the ColorStream, S-video, and RCA inputs, and lack a way to grab high-res signals from a PC. If you're connecting to a TV without a DB-15 input, your only choice is to use S-video, which will unfortunately limit you to 800x600 resolution,



but it's better than nothing.

For a detailed look at the system's connections, consult the connection diagram on page 34.

Speaker Options

A home audio primer

If it's been a few years since you checked into the world of home audio, you'll probably be pleased to hear that things have changed considerably. First, a stereo is now called a "home theater." Second, bigger isn't always better.

The home theater is designed to do two things: drain money from your wallet at an alarming rate, and re-create a movie-theater-like experience right down to the bad-ass surround sound. When you see a movie in a good theater, you're surrounded on all sides by big speakers that pump the contents of five or six discrete, localized audio channels into your ears. These channels create the illusion of offscreen action and add atmospheric sound effects. The speakers are equipped with large woofers that add bass—and with it, a physical sensation—to explosions and other onscreen effects. The discrete channels are encoded digitally on the film's soundtrack using one of several competing formats, the most popular of which are Dolby Digital (DD) and Digital Theater Sound (DTS). THX isn't an actual sound format; rather it's a theater, hardware, and software certification process that ensures an optimal viewing experience.

Because multichannel digital soundtracks are standard on DVD software, receivers (and other equipment capable of decoding that digital signal) have become very affordable. The standard for DVDs is Dolby Digital 5.1 sound, which provides five discrete channels (two fronts, two rears, and a center) and a Low Frequency Effects (LFE) channel. The LFE was originally designed to add the "punch" offered by big theater speakers that's typically missing from home speakers using a nondirectional subwoofer. DTS also encodes 5.1 audio channels, but uses a higher data rate, arguably allowing richer, fuller sound reproduction.

For our Home Entertainment PC, we chose a THX-certified, five-speaker set (with subwoofer) from the Klipsch Reference series, along with the Pioneer VSX-D509S reciever.

If a $3,000 setup is too rich for your blood, check out MidiLand's S4 8200 5.1 computer speakers. With a Dolby Digital decoder, the little MidiLands make a big sound, though not as heartstopping as that of the Klipsch (ask the staff of *DigitalFOTO*, whose desks abut the Lab). For $300, the MidiLands can't be beat for music and movies on a PC.

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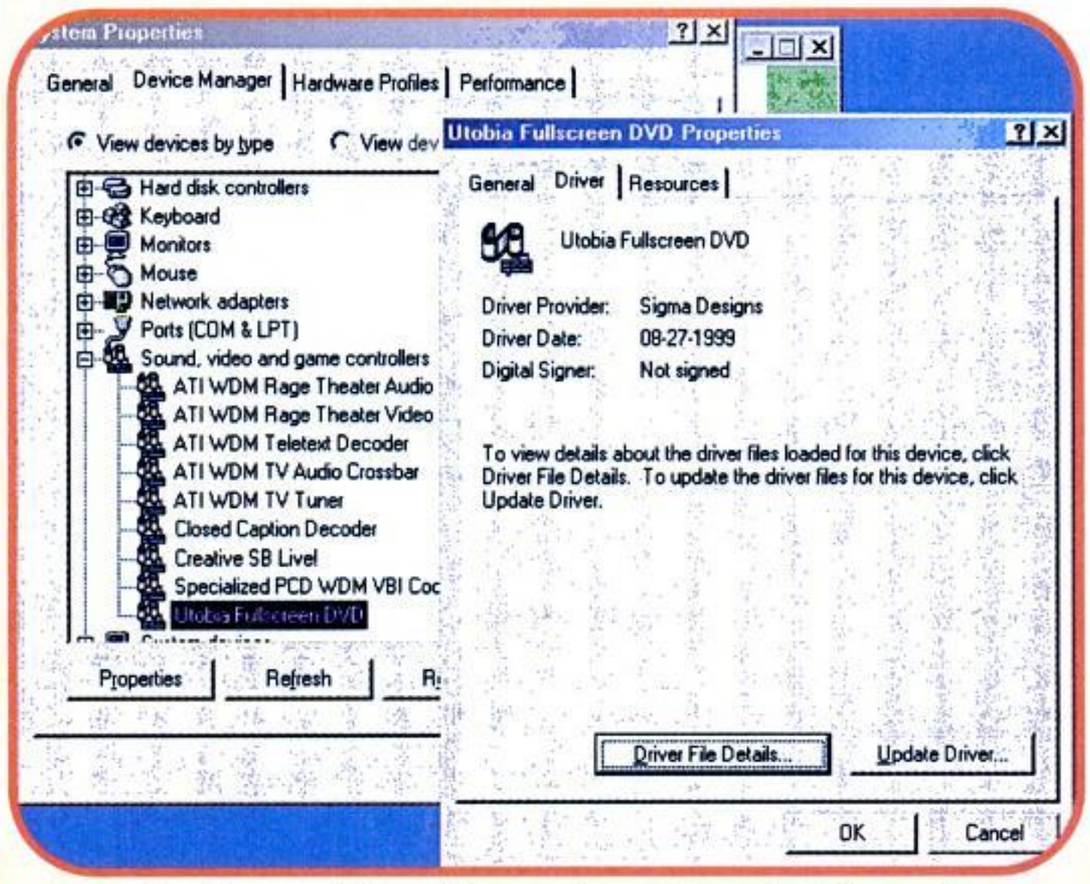
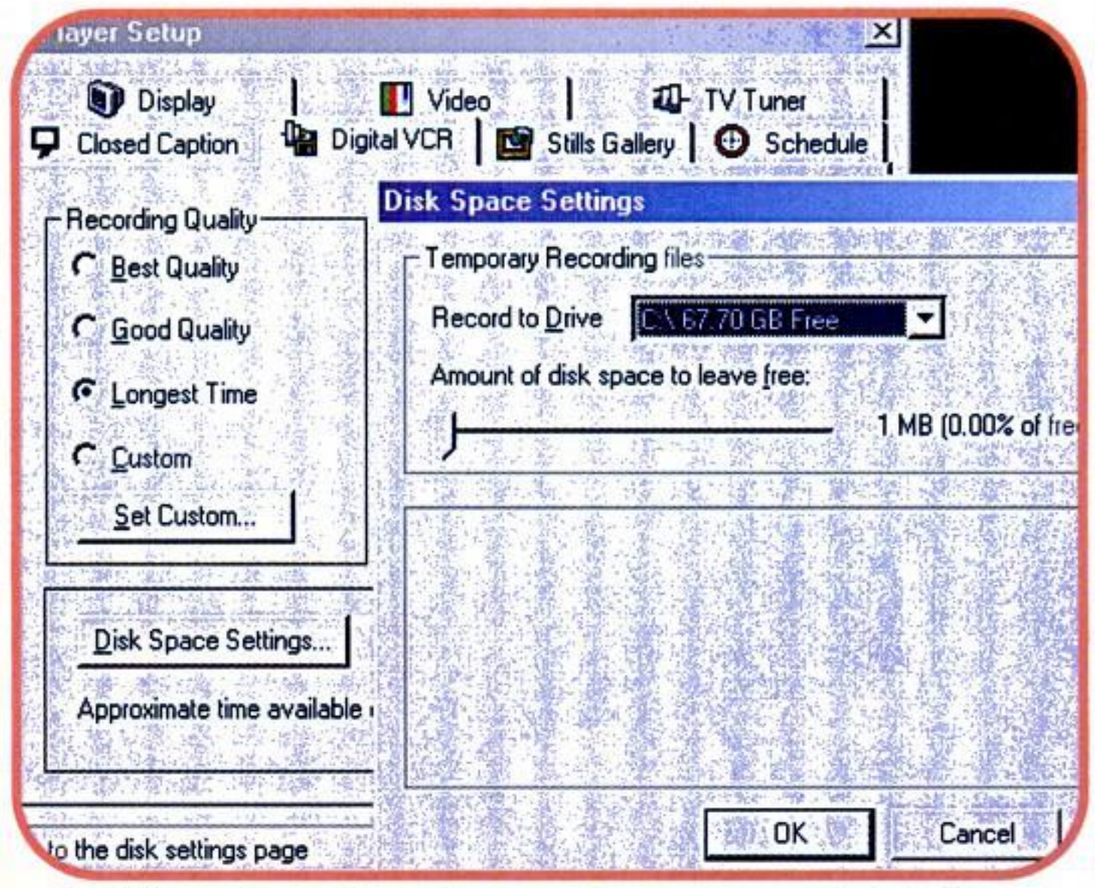
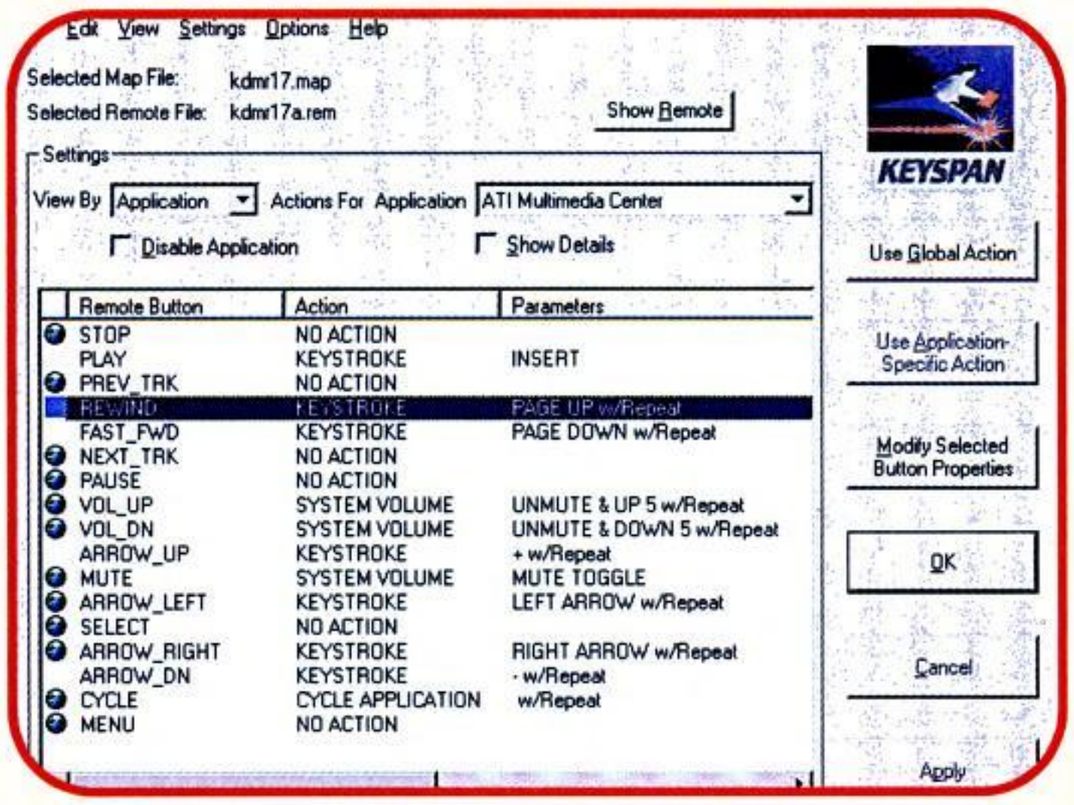
The Software



Prepping for multimedia goodness You should now have a totally assembled system. We'll assume that you've formatted each of the hard drives, installed Windows ME on your main drive, and installed all the latest drivers for the All-in-Wonder, the Sound Blaster Live!, the Keyspan remote, and the Utobia MPEG-2 decoder. Now, install *MusicMatch Jukebox* and *Easy CD Creator*.



Enabling the PVR software To set up your rig's PVR features, load up the ATI TV player, right-click on the screen, and go to the Setup menu. On the Digital VCR tab, go to Disk Space settings and switch the available drive to your 40GB Quantum drive or whatever drive you've chosen to use for PVR purposes. Unless you plan to share this drive with other data, minimize the "Amount of disk space to leave free" setting.



Setting up the remote control While the *iTouch* software provided with the Logitech Cordless Desktop Pro has volume and media controls for most major music programs, we wanted to avoid fooling with a full-sized keyboard every time we wanted to control MP3 playback. Enter the Keyspan Digital Media Remote. Keyspan has recently released beta 2.0 drivers that include presets for both *MusicMatch Jukebox 5.0* and the Utobia Fullscreen DVD player (Note: The remote's software detects the Utobia player as the Sigma Designs Real Magic Hollywood Plus player.)

To control our rig's PVR capabilities via the remote, we used Keyspan's *Remote Assistant* to map several of the remote's buttons—fast-forward was assigned to PgUp, rewind was assigned to PgDn, play/pause were assigned to Ins, and the up/down arrows were assigned to the plus and minus keys.

Final Touches

The final touch is to add *MusicMatch Jukebox*, the ATI TV player, and Utobia's Fullscreen DVD player to our Startup folder, so that all three programs automatically load every time our system boots. To do that, go to Start>Programs, right-click on the Startup menu, and choose Open. Then drag the icons for *MusicMatch Jukebox*, the Utobia DVD player, and the ATI TV program into the newly opened Startup folder on your desktop. The next time you reboot your computer, all three programs should start automatically, letting you effortlessly switch between the three programs from the git-go, simply by pressing the asterisk button on the remote.

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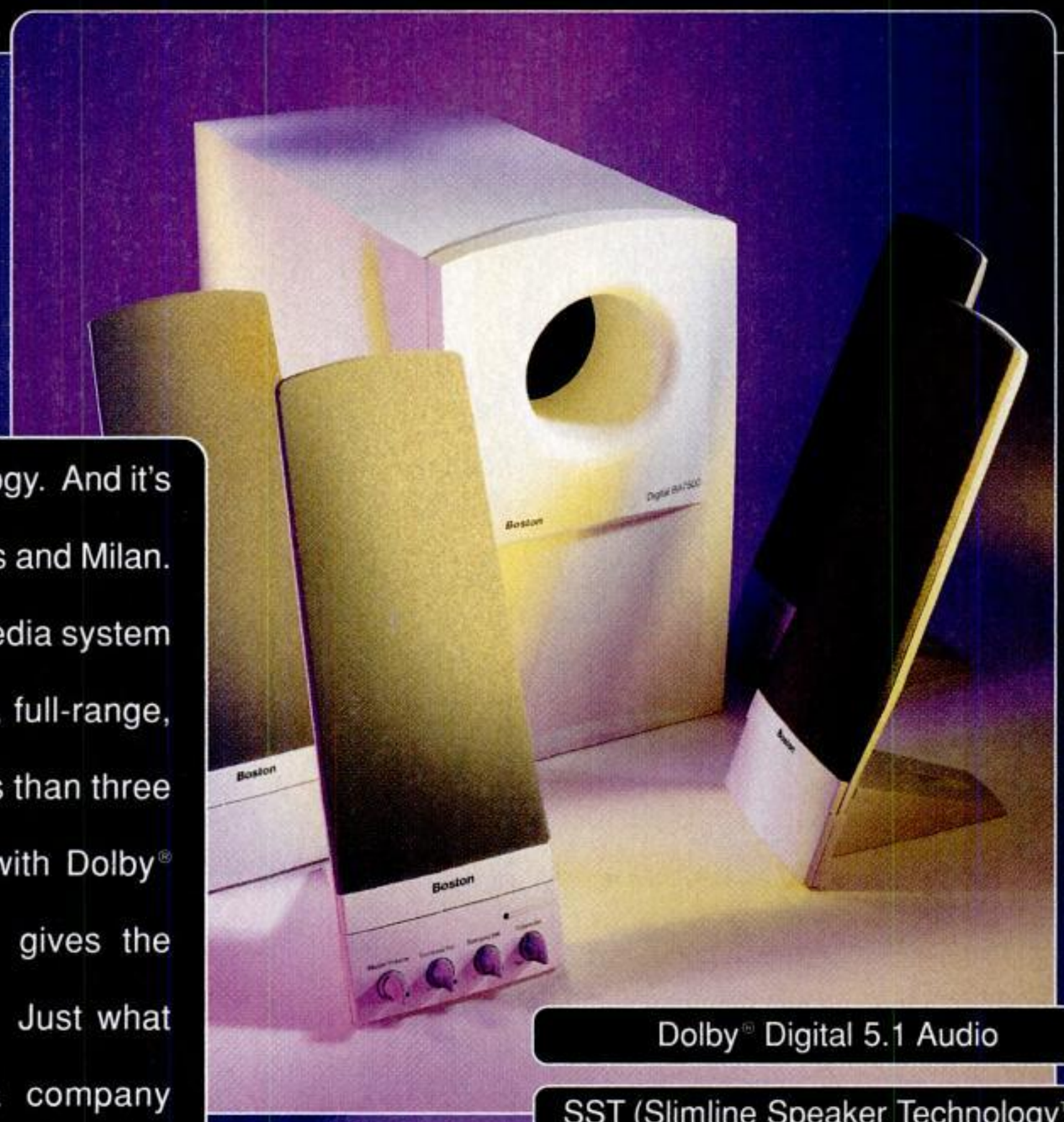

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Staff Picks

They may not all exist, but following are the tunes and flicks that make each staff member's DVD and MP3 Wish List:

Kenn

DVDs: Terminator 2: Judgement Day, Special Edition; Army of Darkness, Special Edition; Vertigo, Special Edition

MP3s: Rahzel, "If Your Mother Only Knew"; Easy-E, "Boyz in the Hood"; Morphine, "Thursday"

Jon

DVDs: Goodfellas; Hard Day's Night; Deer Hunter

MP3s: Camp Lo, "Luchini"; John Coltrane, "My Favorite Things"; X, "In the House That I Call Home"

Scott

DVDs: Cowboy Bebop, Disks 1 to 4; Ghost in the Shell; Fear and Loathing in Las Vegas

MP3s: White Zombie, "Super Charger Heaven (Adults Only Mix)"; Rob Zombie, "Meet the Creeper"; Kittie, "Brackish"

Will

DVDs: Fight Club; Men in Black (DTS disk); Any Given Sunday; Planet of the Apes box set

MP3s: Moby bootlegs

Kristen

DVDs: Raising Arizona; Pecker; Bloodsucking Freaks

MP3s: Liz Phair, "Go Speed Racer"; Soul Coughing, "Super Bon Bon (Propellerheads Mix)"; Jurassic 5, "Concrete Skoolyard"

Katherine

DVDs: Wild at Heart, The King of Comedy

MP3s: The Monkees, "Stepping Stone"; Third Grade Teacher, "Schoolboy"

Josh

DVDs: Easy Rider; A Bug's Life; Homeward Bound

MP3s: The Clash, "Rock the Casbah"; Judas Priest, "Turbo Lover"

Gordo

DVDs: Hard Boiled, Criterion Collection; The Wild Bunch, Director's Cut

MP3s: Por Una Cabeza; The Tango Project

Ruth

DVDs: The Matrix; Bladerunner; any of The Terminator movies

MP3s: Massive Attack, "Man Next Door"; The Cure, "Love Cats"; Pearl Jam, "Evenflow"

Geoff

DVDs: The Great Escape; The Usual Suspects; Kenneth Branagh's Hamlet

MP3s: U2, "Where the Streets Have No Name (live)"; The Police, "Wrapped Around Your Finger (live)"; Nina Gordon, "Tonight and the Rest of My Life (Dance Trip Mix)"

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Capture the M

How to convert your old home movies into an interactive video CD

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Let's face it: You're really not interested in sitting through another showing of your sister's wedding video. You were there, you know what happened, and you don't need to relive it over and over and over again—well, most of it anyway. After all, a few gems were caught on tape: the maid of honor getting caught under the buffet table with the drummer from the band; Cousin Timmy trying to show off his new karate kicks and inadvertently putting an end to the groom's thoughts of a big wedding night; and, of course, the chicken dance.

What if you could take just the highlights from that pile of slowly decomposing VHS tapes chronicling the wedding, your daughter's school play, or your garage band's first gig, and give them a new look? We're going to show you how to convert those old analog memories into a spiffy new digital format, and how to mount the video onto a CD for distribution to your friends and family. We'll cover the two methods of getting analog video onto your PC's hard drive and show you how to build an interactive CD interface for your video with *NeoBook*—the same software we use to build the Maximum CD each month. (If making a video CD isn't your thing, check out the end of this feature for a look at some other things you can do with digital footage and your PC.)

How Video Conversion Works

When you convert old VHS tapes to digital format, you're able to preserve that footage in a format that won't deteriorate over time. If you decide to store the footage on a CD, you're confined to the 650MB of footage that a CD-R can hold—and anyone who's ever sat through two hours of footage from a niece's dance recital will immediately recognize the beauty that editing software and a limited-length medium can bring to home movies.

There are two ways to convert analog footage into a PC-friendly digital format: (1) You can connect a VCR directly to a PC equipped with an advanced FireWire capture board that has analog-in capabilities, or (2) you can connect your VCR to a DV camera via the camera's analog-in port, then connect the camera to a PC via a standard FireWire card. What's the difference between a standard FireWire card and an advanced FireWire capture board? Standard FireWire cards boast only the four- or six-pin FireWire ports that connect to your camera with a FireWire cable. The more advanced FireWire capture boards have those standard FireWire ports, but also offer analog-in and outputs. When you convert footage by connecting a VCR to a DV camera, the camera is actually serving the function of an advanced FireWire capture board.

Confused? Don't worry, it'll all make sense as you read through this how-to. And regardless of which method you use to convert your analog footage, you'll eventually end up with digital footage on your PC's hard drive. That's when you can clean it up, cut it down, and spice it up with effects and titles, using DV editing software. Because it's the industry standard and offers just about every DV editing tool you could ever want, we recommend Adobe *Premiere*. However, *VideoWaveIII*, *MovieShaker*, and *Studio DV* (for those with the Studio DV capture card) are also viable options.

If you're going to store your footage on a CD, you'll want to embed it in an interface that makes it look good and provides the viewer with options such as accessing multiple movie clips. We'll show you how to create that interface with *NeoBook*, the easiest software we've found for basic multimedia creation purposes. (Adaptec's *Easy CD Creator 4* also has a limited "film CD" function, and you can find an excellent shareware program called *Multimedia Builder* available at **www.mediachance.com/oldindex.html**.)

Before you get started, read through the feature to figure out what conversion method you're going to use and what equipment you'll need. And you might want to have some Kleenex handy—after all, you will be watching the wedding again…

WHAT YOU'LL NEED

This is a generic list of the tools you'll need for the task at hand. On the next page, you'll find more specific hardware recommendations based on your need and experience level.

- FireWire capture card with analog-in capabilities
  or
  Digital Video camcorder with FireWire connectivity and an analog-in port
- S-video or composite video cables, depending on the ports on your capture card
  or
  IEEE 1394 cable
- Hard drive capable of sustaining at least a 4MB/sec transfer rate
- Digital Video editing software (Adobe *Premiere*), multimedia creation software (*NeoBook*), and *Easy CD Creator 4*
- CD-RW drive and media for burning and making multiple copies of your CDs
- Photo printer and disc labels (optional)

Getting Video onto the Hard Drive

There are two ways to get the footage off of a VCR tape and onto your PC. Which you choose will depend on what resources you have at your disposal—or what you're interested in buying. Read through both descriptions before proceeding with the project, then go with the method that makes the most sense based on your equipment.

Method One

Use this method if your PC is already equipped with a FireWire capture card that has an analog-in port. *If you don't have an analog-in-equipped capture card but you do have a digital camera with analog-in capabilities and a standard FireWire capture board, use Method Two for this project.*

We used Pinnacle's DV-500 with a BlueBOX breakout box (a box that connects to the back of the card for attaching input/output connections). You'll be hooking a VCR up to the analog-in ports on the card itself, or through a breakout box via S-video or composite cables, then piping the old video directly from the VCR into your PC via *Premiere*.

What do you need?

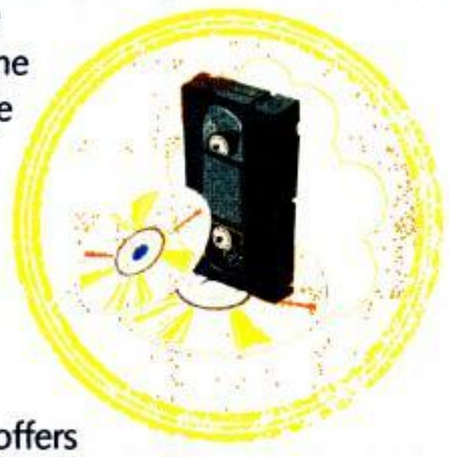
- VCR and tapes to be converted
- Correct cables (S-video or composite)
- Capture card in your PC

Capture cards are a world unto themselves, and options abound. Depending on what you want to do, there's a card for you. Pinnacle and Matrox offer the best options for this kind of project.

Pinnacle

Budget Option: The Studio DC10 Plus card captures full-resolution (640x480) MJPEG and offers a comprehensive editing package for fades, wipes, and other professional effects for converted movies. **Price: $150**

Professional Option: For the price, the DV-500 is the best professional capture board in its class. It offers dual-stream, realtime video editing, MPEG-2 support, and the *Minerva Impressions* software package for CD-R and DVD authoring. It also ships with a realtime version of *Premiere*, in addition to other effects software. **Price: $1,000**



Matrox

Budget Option: The Marvel G400-TV offers hardware MJPEG compression, DualHead display for dual-monitor support, and a TV tuner, as well as a software bundle for editing and special effects. **Price: $300**

Professional Option: The RT2000 boasts realtime native DV and MJPEG-2 editing, web streaming and DVD-authoring abilities, a full software package, and a rendering engine based on the G400 capture board. **Price: $1,300**

Method Two

Use this method only if you have a DV camera with analog-in ports, and a IEEE 1394 (FireWire) board in your PC that is not equipped with analog-in ports. *If your capture card is equipped with analog-in ports, use Method One for this project.*

You'll be using your DV camera to capture VHS footage from your VCR onto DV tape, thereby converting it to digital format. Then you'll be hooking your camera up to the FireWire board and piping the captured footage from the DV tape onto your hard drive using *Premiere*. We used a Canon ZR-10 camcorder.

What do you need?

- VCR and tapes to be converted
- Correct cables (S-video or composite)
- PC with FireWire connectivity
- MiniDV FireWire equipped camcorder

Camcorders come in many different flavors, so there's bound to be one that suits your specific needs. The Big Three of DV cameras are Sony, Canon, and JVC.

Sony

Budget Option: The DCR-TRV11 has a 680,000-pixel, 1/4-inch HAD CCD; 10x optical and 230x digital zoom; a NightShot system; still-shot to Memory Stick; and analog-to-digital conversion with Pass-Through. **Price: $1,400**

Professional Option: The DCR-TV900 offers three 380,000-pixel, 1/4-inch progressive-scan CCDs; 12x optical and 48x digital zoom; still-shot to Memory Stick; PCM stereo; PAL and NTSC playback; and analog-to-digital capabilities. **Price: $2,500**

Canon

Budget Option: The ZR-10 has a 460,000-pixel, 1/4-inch CCD; 10x optical and 200x digital zoom; PCM stereo; and S-video input/output. **Price: $1,000**

Professional Option: The XL-1 is, in our opinion, the end-all-be-all of DV cameras, with three 270,000-pixel, 1/3-inch pixel-shift CCDs; 16x optical zoom with an interchangeable lens system; three-level PCM stereo; full manual control; and analog input/output. **Price: $3,700** (for basic kit)

JVC

Professional Option: The GR-DVL9800U is thoroughly yummy, offering a 680,000-pixel, 1/3-inch progressive-scan CCD with a color filter; 10x optical and 200x digital zoom; PCM stereo; digital still camera capabilities; and S-video in. **Price: $2,000**

For definitions of Terminator words, check out the Terminator online at www.maximumpc.com.

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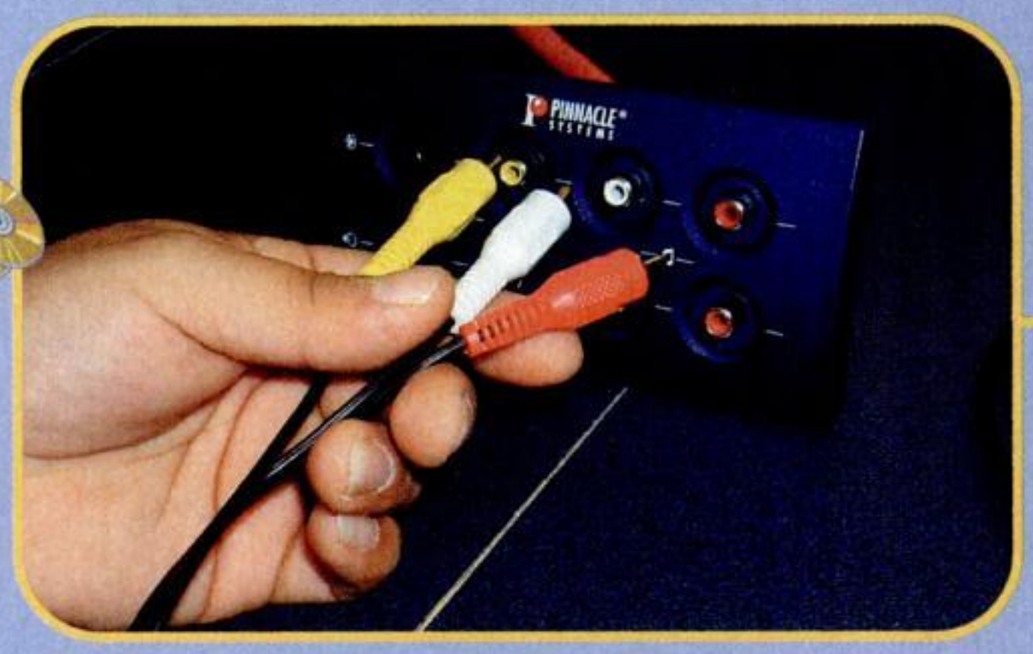
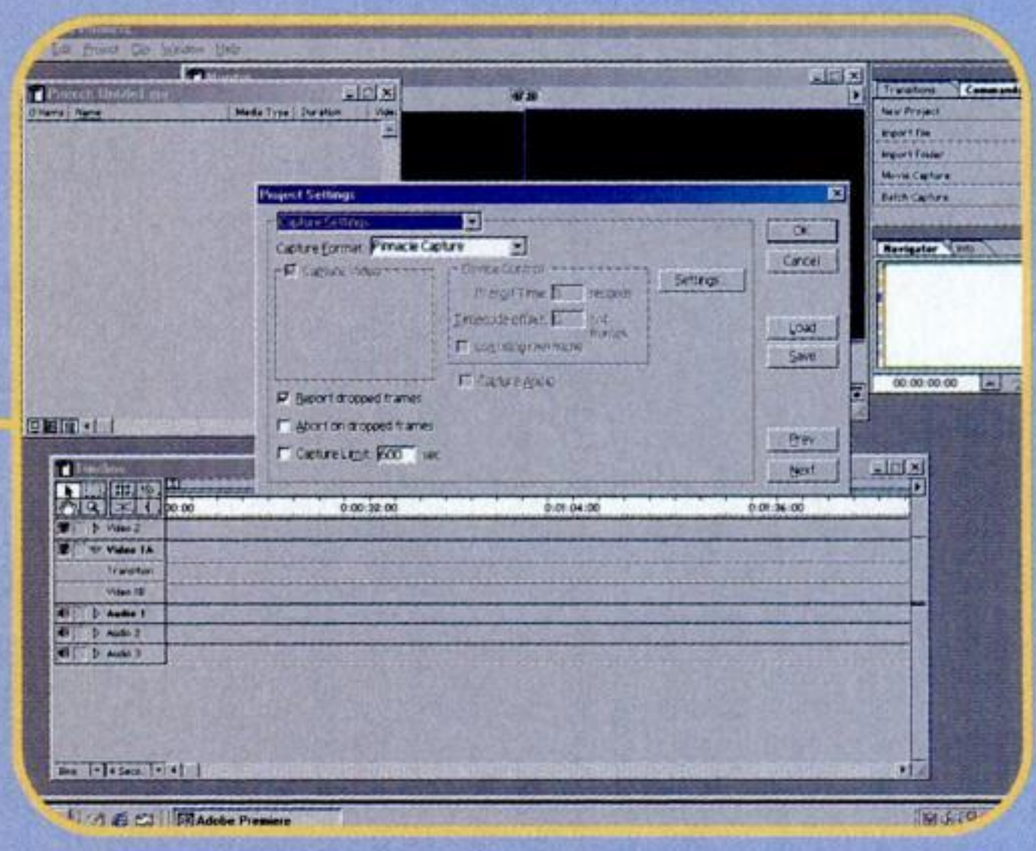
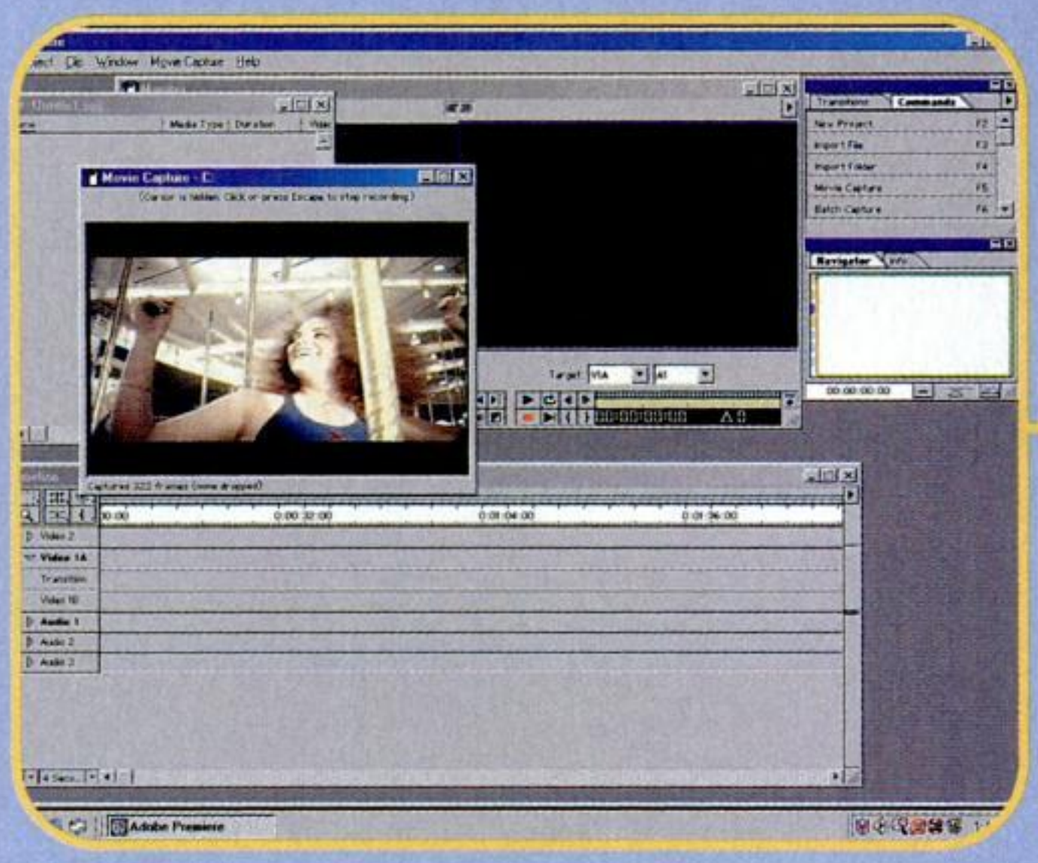
Method One—How-To



Step One Connect your cables. Some cards get twitchy if you do this while the computer is on, so for safety's sake, turn off your computer, plug everything in, then reboot. Note: Our VCR isn't S-video enabled, so we used composite cables. If your VCR and card are S-video-enabled, use that connection—it's preferable to a composite connection.



Step Two Open *Premiere*. On the Capture Settings tab (under the Project/Settings menu in the main work area), choose the appropriate capture format, so *Premiere* knows to turn to your capture card for fodder.



Step Three Turn on your VCR and cue your tape to the point at which you want to begin capturing. Pause the movie. Open *Premiere*, pull down the File menu, and select Capture/Movie Capture. A window will open and display whatever point you've chosen on your VCR tape. Select Record and *Premiere* will begin recording your video to the hard drive. When you've reached the end of the footage you want to capture, click the mouse button to stop recording.

Prepping Your Video For CD

Once your old video is on the hard drive, it's time to breathe some new life into it. We'll leave the fades, wipes, special effects, and soundtrack to your imagination. But there are a few basic things we want to point out:

- Your video, if you're working with *Premiere*, must first be saved to the hard drive. After that, you can import it into your work area, where you can cut and paste clips and add sound and visual effects.
- Editing differs from application to application, but most digital video editing suites use a timeline setup to make laying out the video easier. You'll find various effects and fades/wipes at your disposal, but don't go crazy—you want people to look at the video, not the effects. Also, your videos will be viewed on a computer, not a television, so pull out the highlights instead of putting the entire video of your cousin's bar mitzvah onto a CD.
- MPEG-1 and MJPEG are the best formats in which to save video if you're going to mount it to a CD or stream/post it on the Internet. MPEG-2 provides the best quality, but it's still relatively new and usually reserved for DVD-authoring. *QuickTime* video is is also optimized for the web. AVI might be too gigantic, depending on the length of your project (remember, you have a 650MB limit on standard CD-Rs, and if you want to mount more than one movie onto the same piece of media, you could be in trouble if you go AVI).
- If you're working in Pinnacle's *Studio DV*, you'll have the option of exporting your footage as an MPEG; *Premiere* doesn't offer this option, so you'll need to export finished video as an AVI and use a third-party program, such as XING's *MPEG Encoder*, to convert it to MPEG format.

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MIDTOWN MADNESS 2

www.microsoft.com/games/midtown2

EVERYONE
CONTENT RATED BY ESRB

Microsoft

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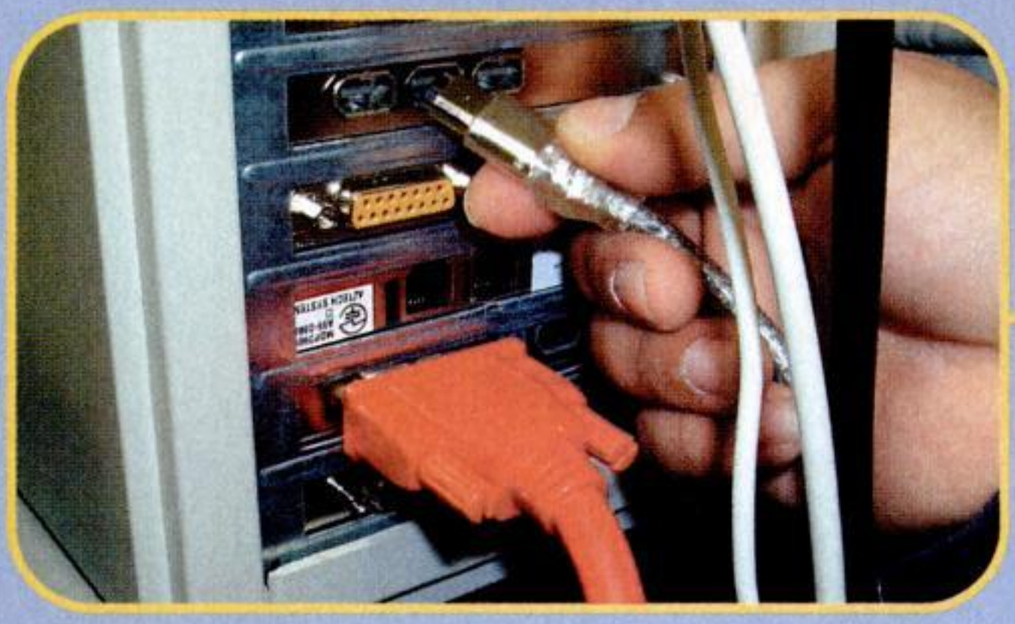
Method Two—How-To

Step One Load a blank DV tape into your camcorder. Load your VCR with the VHS tape you want to convert and forward it to a point 10 or 15 seconds *before* the point at which you want to start recording—you're going to be dubbing one tape to another, so you need to allow a little lag time between the two. Pause your VCR, then switch your camera to VCR mode.

Step Two Connect the S-video or composite cables from your VCR to your DV camera. Your camera will likely accommodate either cable (check your user's manual if you're not sure), so which you use will depend on which one your VCR is equipped with. As we mentioned before, S-video is the preferred option, because it produces more lines of resolution than composite, and separate channels handle luminance and chrominance information, resulting in a sharper picture.

Step Three Press the camera's REC PAUSE (Line-In) button. The name and location of this button may vary—it may also be called the ANALOG REC or the DUB button, depending on the camera, but all cameras should have a Line-in/Record button specifically for dubbing purposes. It's usually located near or integrated with the camera's VCR controls. If all else fails, check the owner's manual.

Step Four Unpause your VCR and let your old tape begin to play. Press the camera's REC PAUSE button again. The camera will begin recording your old tape onto a DV tape in digital format. When you've recorded all the footage you want, press the STOP button on the camera's VCR controls, then stop the VCR itself.



Step Five The footage from your old VHS tape is now on the DV tape in your DV camera, just as if you'd shot new footage with the camera. To pump it onto your PC's hard drive, turn on your computer and use a FireWire cable to connect the DV camera to the FireWire card in your PC. Fire up *Premiere* and be sure its Capture Settings are set to recognize your card. From *Premiere*'s File menu, select Capture/Movie Capture. Hit Record to get your video from the camera through the FireWire card and onto the hard drive. Hit ESC or click the mouse to stop recording. Your old VHS footage is now living on your hard drive as digital footage.

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What makes the ideal CD burner? It's what you hear—or don't hear—on your recorded disc. That's where Plextor® drives quietly stand alone. For instance, try plugging into Plextor's fastest-ever Ultra SCSI CD-Rewritable drive, the new PlexWriter™12/10/32S.

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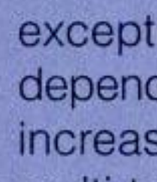
Leave the noise behind.



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PC WORLD BEST BUY — PlexWriter 12/10/32A September 2000
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MEDIA — PlexWriter 8/20 February 1999
PC WORLD WORLD CLASS — PlexWriter 8/4/32 July 2000

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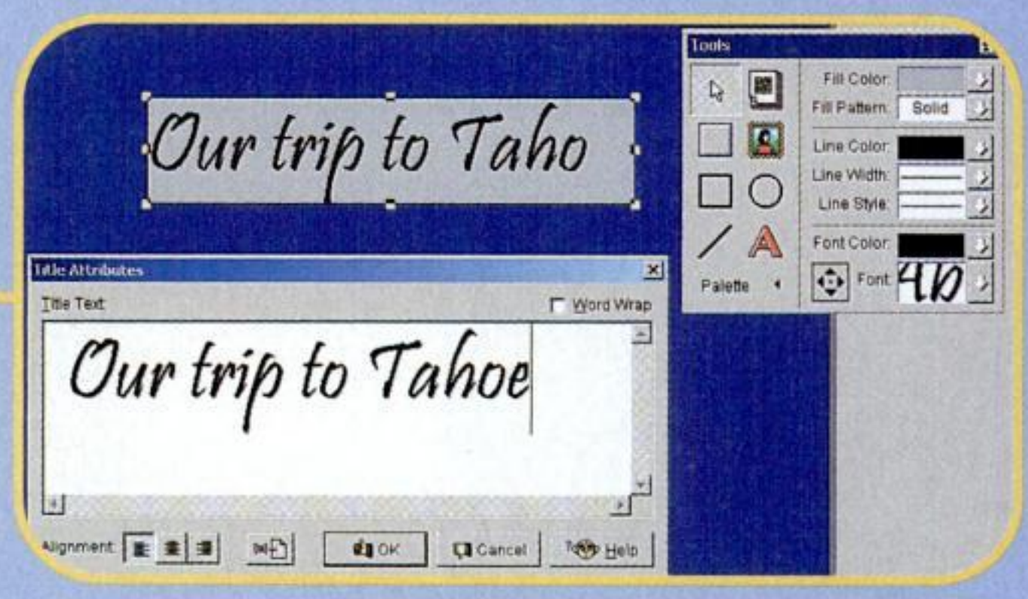
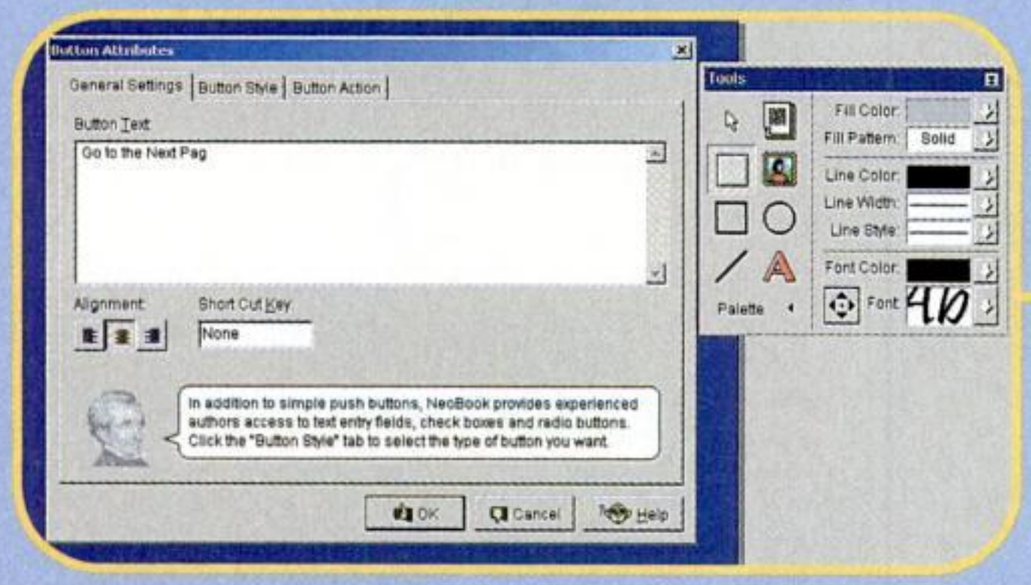
Creating an Interface and Mounting Your Video to CD

We'll leave the actual page design up to you, but here is a basic guide to using NeoBook *to create an interface for your footage, and details on putting your finished product onto a CD. Don't forget to check out* NeoBook's *help menu for more information on using the application.*

Step One: Setting Up To fine-tune icons, variables, and navigation controls, select Book Setup from the Book menu. From the Page/Page Attributes menu, select background colors, page effects, and actions for the pages in your project. This is also where you can add, rename, or delete pages. If you select New Publication from the File menu, you can choose a pre-selected window size or create your own, and choose the color depth for pictures and film clips. Note that *NeoBook* provides a Master Page you can use to create a template for projects that need a uniform look. If all your pages will look different, you can ignore the Master Page entirely.

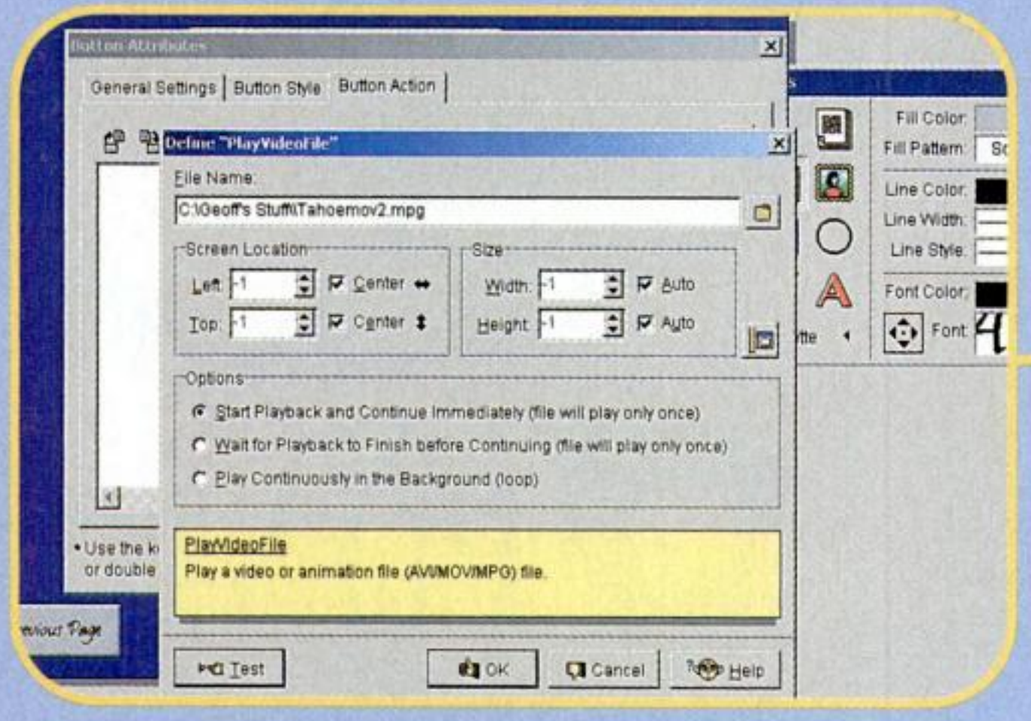
Step Two: Making Titles The "A" button on the tools palette lets you add short titles and spot text to your project. Click in the work area and a Text Attributes box appears. Type your text and click OK; the text will appear in the work area. To change its position, select the arrow tool on the palette, click the box where your text is and drag it. Font, size, text color, and box-fill color can be adjusted using the controls to the right of the "A" button.





Step Three: Making Simple Buttons Select the button tool (the shadowed square in the palette, under the pointer tool) and make a box on the work area. A Button Attributes menu will open, where you can load icons to use as buttons, set button functions in the Button Action/Insert Action Command tab, and add text to buttons. Right-click on a button to change its attributes.

Step Four: Using Images Import images by clicking the "picture in a frame" icon on the tool palette, then creating a border for your image on the work area. A window will open so you can locate your image; clicking OK will bring it into the work area. Right-clicking on the image opens an Image Attributes box where you can scale the image to the border, use scroll bars, and make the image opaque or transparent.



Step Five: Mounting a Movie and Making Action Buttons
Add a new page that will be dedicated to viewing your video. Select the button tool and make a small box in a readily accessible spot on the work area. When the Button Attributes box opens, go to the General Settings tab; title the button "Play." To make a Stop button, copy your Play button; move the copy to another part of the page; right-click on it and change the button text to "Stop"; then choose the command Stop Media from the Insert Action Command menu. (Be sure to erase the Play command that was already there.) Under the Action/Insert Action Command tab, select Play Video File. An import menu opens so you can find where you've stored your video. When you hit OK, another menu opens where you can define the video's size and looping options.

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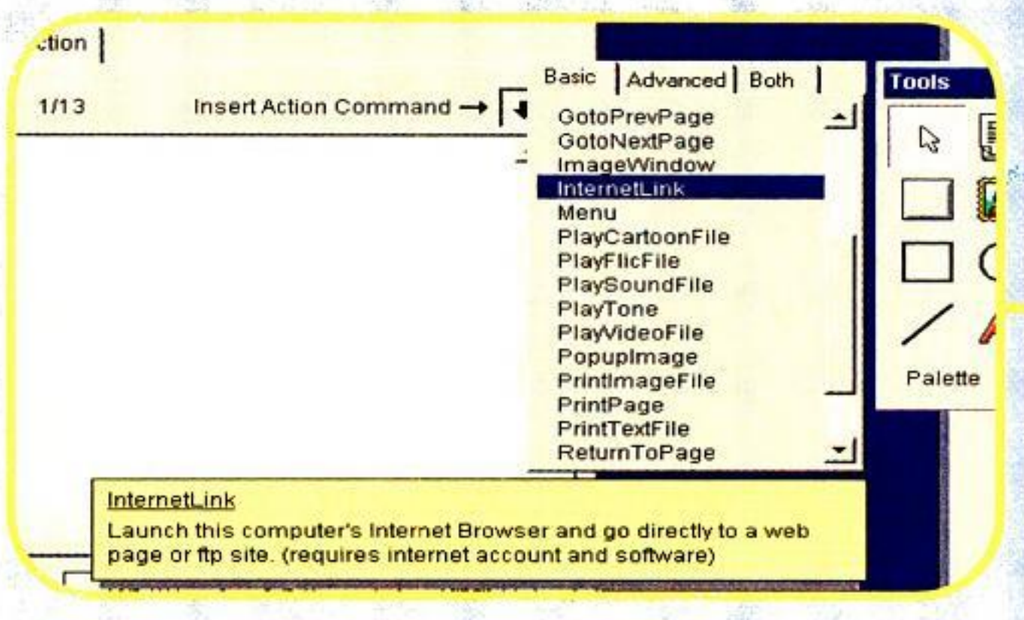
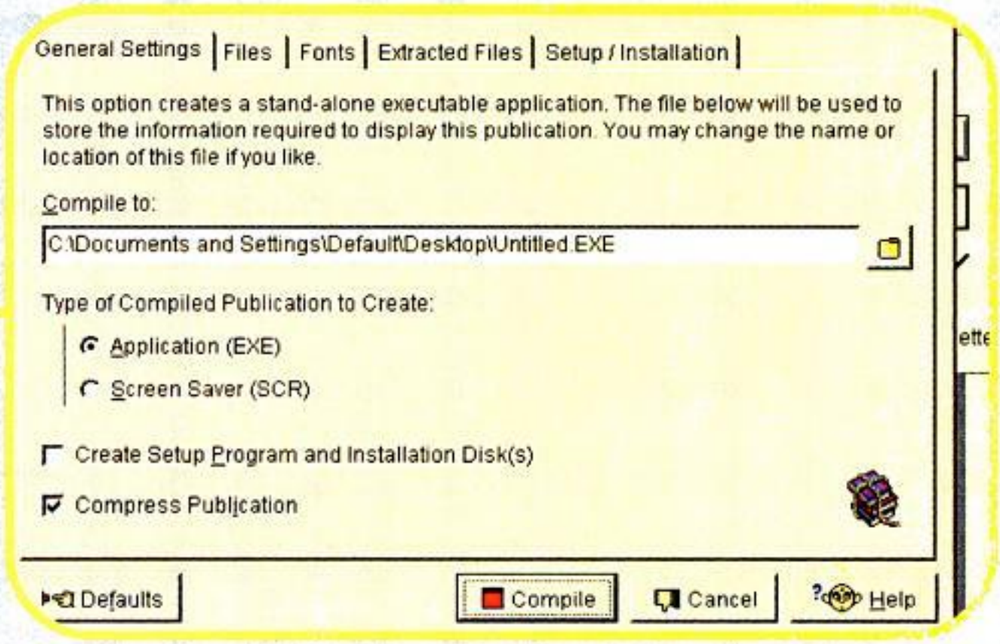


Step Six: Action Commands *NeoBook*'s action-command options are somewhat limited; for example, fast-forward and rewind commands aren't available. However, *NeoBook* does allow you to create buttons that will launch a URL from your video CD (InternetLink command), expand smaller images into their own windows (ImageWindow command), play sounds (PlaySoundFile command), or jump to different pages (GoToPage "X" command).

Step Seven: Testing Your Interface When all of your pictures, buttons, and other layout elements are set up in the work area, test your pages to ensure that the buttons work and that your video and/or sounds run properly. Click the Run tab on the Book menu to make your interface go live—that is, to make all the buttons, navigation, and commands work as they would if your project had been published. Navigate through your presentation and test all links and buttons. To stop the demo and return to the main *NeoBook* interface, click Book/Stop or hit F8.

Step Eight: Publishing It's time to turn your *NeoBook* document into an EXE file that will self-launch when someone opens it. Choose Book/Compile to see a list of option tabs with a variety of export options. Keep all the defaults unless there's something you want to tweak, then click Compile. *NeoBook* will create a stand-alone EXE file that will act as a self-launching application you can burn to a CD.



Step Nine: Create an Auto Run File Before you can create a CD, create an AutoRun file that tells Windows to automatically launch your finished EXE when you insert the CD containing it into a CD-ROM drive. Open *NotePad* and directly copy the text you see in this screenshot. The only change will be the title of your EXE program—be sure the text you enter into *NotePad* is an exact match of your EXE program title (i.e., if your program is called tahoe.exe, enter that where our screen shows "triptotahoe.exe"). Save the *NotePad* document with the file extension INF. Copy the Sky32v3c.dll file from the Program Files/*NeoBook* for Windows folder into the folder containing your EXE file; *NeoBook* needs this file to launch your EXE.

Step Ten: Burn It! Launch *Easy CD Creator 4* and select Data CD from the layout options. Drag the AutoRun file, the Sky32v3c.dll file, and the completed EXE into the layout. You may want to drag the contents of your page (i.e. pictures, movie files, text) into the layout as well, because *NeoBook* sometimes gets twitchy and wants to refer to these files. When your layout is completed, hit Record CD. *Easy CD Creator 4* burns your video CD to a disc. When it's completed, put the CD into a drive. If the AutoRun filis working properly, the CD should automatically spin up and your interface should appear.

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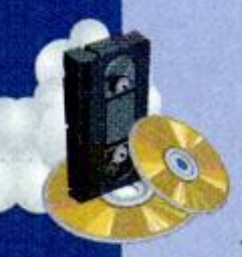
Finishing Touches



With *Easy CD Creator 4*, you can add some classy finishing touches to your work. Use the Jewel Case Creator found in the opening menu options to make leaf inserts and labels for your CD. A good photo printer and a labeling tool such as CD Stomper can make you look like a pro in no time. Self-adhesive CD labels are available wherever printer paper and media are sold. A self-extracting CD with video, a photo gallery, and jacket cover art makes a perfect keepsake item for families and friends and is much more entertaining to look at than the boring prospect of a pile of old home movies, dance recitals, and bad karaoke.

Now What?

Once your video is on your hard drive in digital format, there are lots of things you can do with it. Depending on your cashflow, desire, and creativity, you can use it for a wide variety of fun projects. If you have a band or an act that you want to self-promote, you can build a snazzy interface around your performance and distribute it, jacket cover and all, to those bigwigs on the club circuit. If you want to produce CDs for actual clients or create more complex presentations, consider looking to Macromedia *Director 7* or *8*, so you can add animation and more powerful interactivity to your discs.

DVD-authoring, while still in its infancy, is swiftly becoming the next big thing among video producers and hobbyists. Video is saved in MPEG-2 format (the same format as standard motion-picture DVDs), then mounted to a DVD disc. With almost 8GB of storage space on one DVD, you're not only capable of achieving stupendous quality, but can also include a slew of menus, special features, and behind-the-scenes tidbits. Be warned: Authoring kits, software, and capture boards can set you back thousands of dollars, so it's a hobby for pros and fanatics only.

Not quite ready to conquer Hollywood? All you need is a web site, and you can stream video to the online world using software that transforms video into a mutable format that can be played as it downloads from a web browser. Quality usually takes a hit, window size isn't great, and you have to cater to visitors with low-bandwidth connections, but it's a quick and relatively painless way to get your video seen by the masses.

You can also extract frames from video clips, or portions of clips themselves, and create photo albums or video e-mail.

DVD-authoring Check out Pinnacle's web site at **www.pinnaclesys.com**, for a look at capture boards made for this type of work. Also look at Daiken, the leader in the industry for mounting and interactivity software, **www.daikendvd.com**. Would you rather have someone else do it for you? Check out the DVD Master at **http://dvdmaster.com**.

Video Streaming for the Web The best software available for converting video into a format that's easily streamed on the Internet is Emblaze's *VideoPro*; XING's *MPEG Encoder*, which has numerous settings for various modem speeds, is also worthy.

Photo Albums *Premiere* and other digital video editing suites will always offer the option to export individual frames from your video. You can use this to create a photo album of what's on your video CD, or to include a "preview" of what's inside.

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I'd Sell My SOUL For a Perfect 10

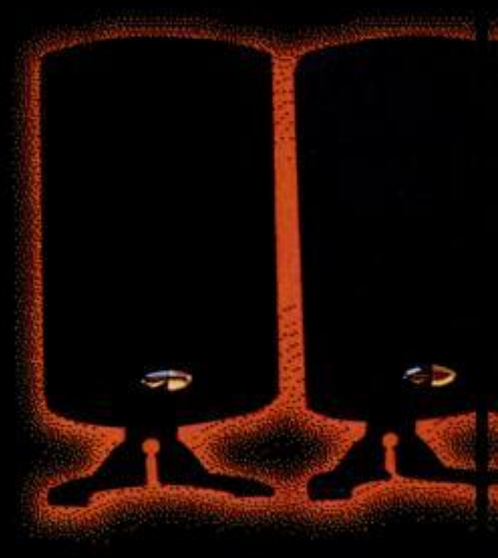
Can a Maximum PC fanatic configure a system worthy of our highest praise? Mark Miller of Long Island, NY, claimed he was the man for the job. Here's his story—followed by our own brutal review…

I'm not ashamed to admit it. I'd give anything—*anything*—to bend *Maximum PC*'s verdict scheme to my will.

In his January 2000 Edword column, Editor-in-chief Jon Phillips described a PC that could earn *Maximum PC*'s highest honor, a Perfect 10 verdict. As soon as I read Jon's description, I knew I had to have such a rig—by any means necessary. Thus began my mission to create a PC worthy of an ungodly score.

To fund my obsession, I shamelessly convinced the higher-ups at my office—where, I might add, I'm a practicing attorney at law—that my four-month-old PC had become obsolete. I employed every argument at my disposal to secure "a system that would last for at least a year with no more than two videocard and processor upgrades." Which basically means that they provided me with an unlimited budget. Hoo-wee!

Sketching out a rough idea of my übersystem's core components was an exercise in decadence. "SCSI tastes nice," I thought. "Mmmm… Ultra 160 RAID 0 SCSI. Delicious!" The best memory available was PC800 RDRAM, so of course I had to have it. I was living high on the hog, all right. Dual-processor support, along with the finest optical drives, videocard, and audio sub-systems were obligatory—as was a cooling solution designed to put all others to shame.



Though I hand-selected each and every component in my creation, I hadn't the time to shop for parts and

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assemble the monster. That's why I called upon the computer builders extraordinaire at Alienware to carry out my whims.

But, oh, there were tough times ahead. I agonized over the motherboard, choosing an i820 model over an i840 board because, at the time, the latter offered 64-bit PCI slots but no Rambus support. When I found that the only high-performance RAID card that worked with Windows 98 had major incompatibilities with my Seagate Cheetah hard drives, I was heartsick. And the search for the perfect case—a real looker, with excellent ventilation and accessible 5.25-inch drive bays (I needed 10 of 'em)—brought me to tears. I purchased and nixed two different cases before settling on the eventual winner.

My component list was a revolving door. An ASUS P3C-D dual Coppermine mobo gave way to the P3C-LS (which includes onboard LAN and SCSI support) when I ran out of PCI slots. A Quantum Atlas 10K II hard drive fell by the wayside because Seagate got the Cheetah 18XLs to me first. And nVidia drove me to distraction by announcing a faster GeForce card every other week. I finally settled on the 64MB DDR Radeon's combination of performance, image quality, and superior video-out. The CPU grew from 866MHz to 1GHz, and, just before Alienware shipped my system out, I had a 40.9GB 7,200rpm ATA/66 Maxtor thrown in—just for the hell of it. I'm silly that way.

What lies ahead for my Alienware? Hopefully, a score that smashes *Maximum PC*'s verdict scale. Then, a videocard upgrade to 3dfx's next-gen offering, since 3dfx's 4x FSAA can't be beat. When RDRAM prices come down from the stratosphere, I'll pop in another Kingston 256MB RIMM. And later, when I lower the PC's status from "personal workstation" to "server," the 40.9GB Maxtor will go in favor of another 18XL, for five-spindle RAID 5 madness. On the audio front, I'm hoping Klipsch creates a multimedia version of its five-speaker Quintet home theater microsystem, which will offer true 5.1 channel sound. Otherwise, I'll eventually invest in an inexpensive Denon A/V receiver to power the Quintets. And of course, I'll brazenly set myself up with a *dual* 24-inch Sony display—just as soon as I find a cooling solution that makes hell freeze over.

OK, *Maximum PC*, now what do *you* think?

Mark Miller appears as "Chamsalot" on Maximum PC*'s online forums (www.maximumpc.com) and occasionally reviews products in the magazine.*

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Chamsalot P-III 1GHz

A KILLER RIG WITH A FATAL FLAW

We like Chamsalot, but his system didn't like us.

When Mark Miller, a.k.a Chamsalot, first notified us of the verdict-busting system he was having Alienware construct, we were skeptical. Packing oodles of next-gen hardware into a PC is like begging to have your life put on hold by resource conflicts, buggy drivers, and everything in between. Luckily for Chams, the system didn't put *his* life on hold—but it sure as heck put ours on the back burner. The Chamsalot Alienware arrived so chock-full of problems, it required multiple staffers to toil in the Lab for days on end in search of solutions.

As far as we're concerned, the blame for this system's troubles doesn't rest on Chamsalot's shoulders, but rather on those of the folks at Alienware (**www.alienware.com**). Chams picked all the right parts for his rig, but Alienware shipped the system knowing that it contained a fatal flaw: a dysfunctional RAID array. In its defense, Alienware says it thought the problem was with *HD Tach*, not its implementation of RAID. Huh? We've never had a problem with *HD Tach* and RAID—until now, that is.

It's a shame the RAID array was possessed by Satan, because the Chamsy PC has all the markings of a Perfect 10. Every component is obviously the best that money can buy.

The array (now known affectionately in the Lab as "The F***ing Array") reported at its expected capacity of 36GB and was essentially functional, but recorded pathetic benchmarks scores, which is how we knew that something was amiss. We tried every trick in the book to make the array work, from upgrading the drive's firmware to installing an add-on RAID accelerator to changing the OS to Windows 2000, all to no avail. Hours of phone calls with the folks at Seagate, DPT (maker of the RAID controller), and Alienware yielded no effective response, so we threw in the towel.

It's a shame the array was possessed by Satan, because the Chamsy PC has all the markings of a Perfect 10. Every component—including the 24-inch Sony FD Trinitron monitor, the 64MB Radeon graphics card, and the Klipsch speakers—is obviously the best that money can buy. Kudos to Chams for his impeccable component selection. Crap-os to Alienware, Seagate, and DPT for spoiling the party. To this day, none of these vendors will take responsibility for the RAID problem.

The PC's benchmark scores don't jibe with the killer components within, so we have to give credit for the poor performance to the RAID array's problems (the four striped drives actually perform worse than a single drive). Case in point: In *SYSmark*, which runs a battery of real-world action scripts in common desktop application, the Chams box scored a mediocre 179. That's 10 points below the score of HP's 1GHz machine (June 2000), and 60 points lower than our Dream Machine (September 2000). Luckily, every other benchmark score (with the exception of *HD Tach*, of course) was more than respectable, and the Chamsy even set new records in both gaming benchmarks.

So, where does this leave Chams in his quest for a Perfect 10 or better? The staff debated long and hard over how to proceed, eventually settling on one simple premise: If a vendor had sent us a system in this condition, we'd show no mercy in the review.

Thus it is written, thus it is so. The Chamsalot Alienware's RAID problems earn this system a verdict of 6. Had the hard drives worked as expected, we think this system could have earned a Kick Ass 11—maybe.

Those who think we're being too harsh on Alienware should know that the techs we spoke with there told us that the system's array benchmarked at 30MB/sec read speeds before shipping. That's approximately 70MB/sec slower than normal—and yet they sent the system anyway. We were also told that Alienware didn't install several of the 80mm fans Chams requested because—get this—they "ran out of screws." You chose sweet components, Chamsalot, but it seems you chose the wrong company to put them together.

—Josh Norem

PLUSES
- Obscene hardware
- Case of the Gods
- His boss paid for it

MINUSES
- Perplexingly slow in *SYSmark*
- Wack RAID array
- Long-ass boot time

MAXIMUM PC VERDICT 6

$10,000 (approximately) | Custom configuration by Alienware

REAL WORLD BENCHMARKING

CPU/MOTHERBOARD	bootMark		500
WIN9X APPS	SYSmark2000	official score	179
HARD DRIVE	HDTach	MB/sec	14
CD-ROM	CDTach98	drive rating	29.7
MP3 RIP/ENCODE	MusicMatch	sec	154
IMAGE EDITING	Adobe Photoshop 5.5	sec	123
DIRECT 3D	3DMark 2000	fps	70
OPENGL	Quake III Arena	fps	77

0

Visit www.maximumpc.com/benchmarking for benchmarking explanation.

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UNDER THE HOOD

THE BRAINS

CPU	1GHz Intel FC-PGA P-III Coppermine
L2 cache	256K full-speed
RAM	256MB Direct RDRAM
Motherboard	Asus PC3-LS, Intel i820 chipset

DISPLAY

Video	ATI Radeon 64MB DDR SDRAM VIVO
monitor	24-inch Sony FW-900 (22.5-inch viewable), .23–.27 variable stripe pitch
Refresh@ max res	80Hz@2304x1440
MPEG decoder	Sigma Designs Hollywood Plus

STORAGE

Hard drive	Four 9.2GB SCSI Seagate Cheetah 18XLS (10,000rpm), one ATA/66 Maxtor DiamondMax Plus 40GB (7,200rpm)
DVD	Pioneer 16x DVD-115
CD-RW	SCSI Plextor 12/4/32 Plexwriter
CD-ROM	SCSI Plextor UltraPlex Wide (40x)
Removable	Iomega Zip 250, floppy
SCSI RAID	Onboard Adaptec AIC-7892 Ultra160
tape drive	DPT Smart RAID VI Decade Ultra160 OnStream ADR50 LVD SCSI 50GB

NETWORKING

NIC	Onboard Intel 8255x-based 10/00

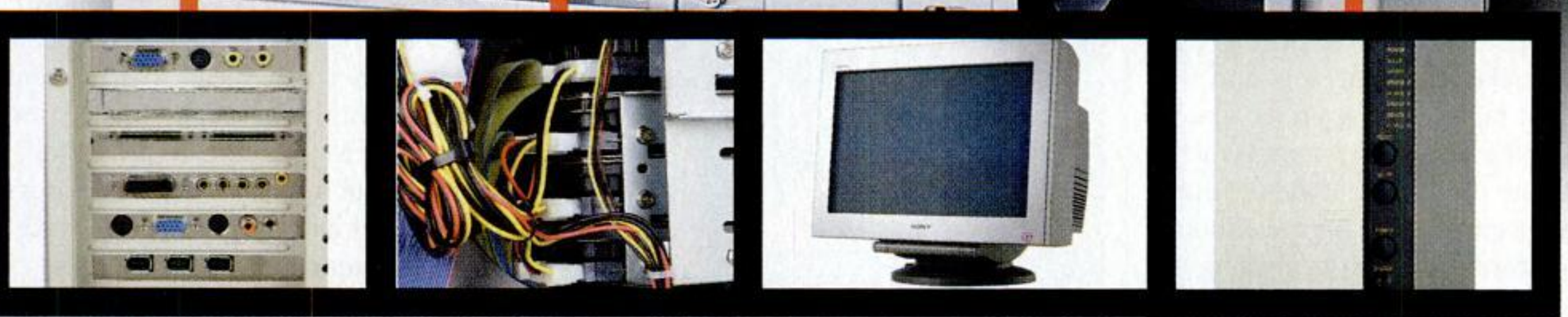
SOUND

Soundcard	Sound Blaster Live! Platinum with Live Drive II
Speakers	Klipsch ProMedia V.2-400

OTHER

	SIIG FireWire Card

BOOT **2:17** DOWN **0:05**



PCI party. Chams' system has only five PCI slots and he managed to fill all but one. The slick-looking DPT RAID controller has a Knight-Rider-like red light that swishes back and forth during operation.

SCSI RAID = Pain in the ass. We couldn't get Seagate's drives and DPT's Decade controller to play nice in our Dream Machine and we had similar troubles with this system's four-drive array.

We can keep this, right? Chamsalot's selection of the 24-inch Sony FW-900 puts our Dream Machine's 21-inch Sony F-500 to shame. Kudos on the monitor, Chams.

The case is an ace! The Antec case Chams picked is super sweet, with bays for days and cooling options-o-plenty. Dig the temperature gauge, SCSI device counter, and pop-open door.

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Teaching Your System To Breathe

WE BLOW SMOKE IN SEARCH OF A CLIMATE-CONTROLLED CASE.

With 1GHz CPUs, fast IDE hard drives, and multi-GPU videocards generating enough heat to deep-fry an Arkansas pickle, the flow of fresh, cool air through your system is becoming increasingly important to keep your system stable.

For some hobbyists, airflow's as mysterious as black magic. Are your case fans blowing air out or sucking air in? Where are the dead spots in your case? Does it help to have a fan blowing on top? What about drive-bay coolers? We decided to find out.

We compared two systems—a home-built dual-Celeron rig wrapped in a SuperMicro full-tower case complete with a bazillion fans, and a factory-equipped Dell 733MHz with the default two-fan config—to determine which had better airflow. We predicted that the SuperMicro would kick the Dell's ass.

EQUIPMENT AND SETUP

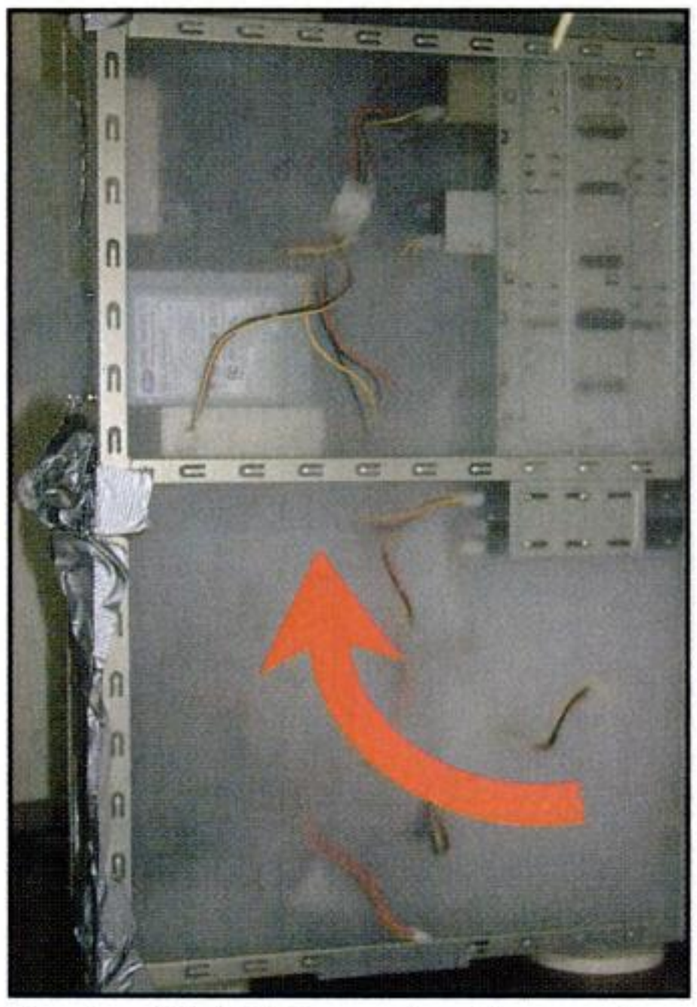
We conducted our airflow tests using equipment available to anyone. From our local Ace Hardware, we purchased a sheet of Plexiglas, duct tape, five feet of flexible heater vent tubing, and a Plexiglas cutter. Our big-dollar purchase was a smoke/fog machine made by Visual Effects. Sold primarily for use on dance floors and in haunted houses, the VEI V-925 set us back $125 at a Halloween store. The device works by vaporizing a "fog fluid" mixture into superfine particles.

To fashion our test rig, we cut the Plexiglas to replace the case sides and used the duct tape to seal leaks all around the edges of the Plexi. After some experimentation with different methods of introducing smoke into the systems, we found that we got the best results by feeding smoke into the systems via a heater hose connected on one end to the smoke machine and on the other end to a cardboard box fitted over the PC's front air intakes. We filled the entire system (and the attached cardboard box) with smoke to make airflow patterns visible. While we were able to see distinct patterns emerge when we turned on the smoke-filled PCs, the still photographs don't illustrate this, so we've added arrows to highlight our observations.

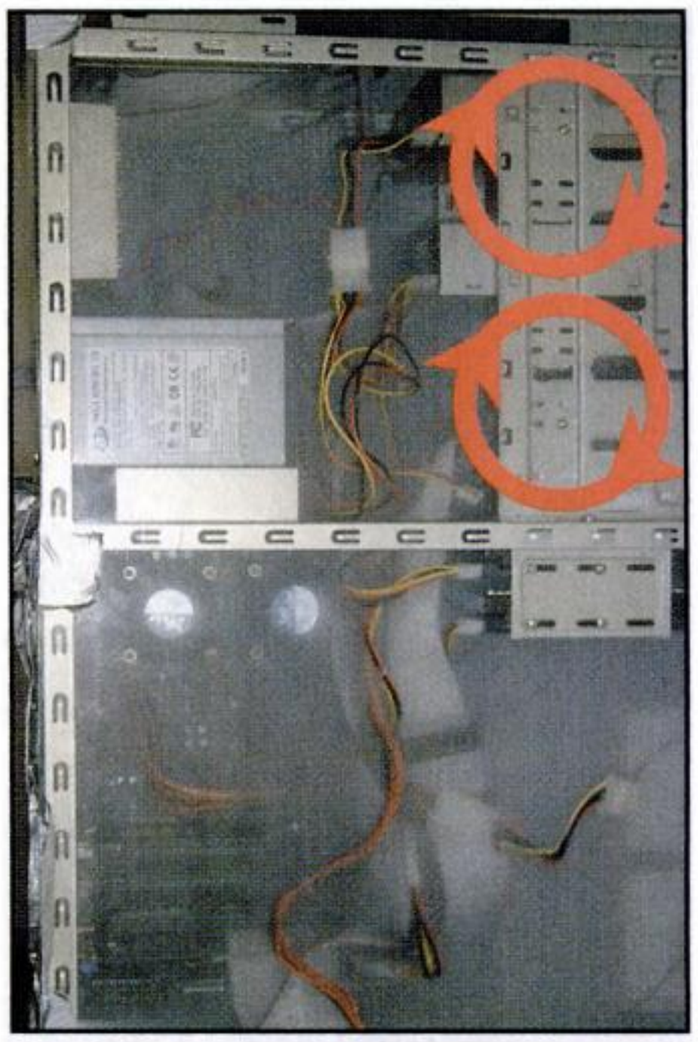
Anyone can buy these materials and conduct airflow tests on his system, but be aware that there's always risk associated with pumping mist into an electrical device. Electric shock is certainly a consideration, along with the potential destruction of delicate electronic components. And if you work in or near the Imagine Media offices, you are undoubtedly aware of the risk of setting off the smoke alarm, explaining to irate members of the facilities department exactly why there's smoke pouring out of your Lab, and spending a weekend wracked with guilt about causing a false alarm that forces a Code 3 fire department response. But we digress (and offer sincere apologies to all who were put out by our antics).

CASE STUDY 1: SUPERMICRO SC-750A

We performed our first test on SuperMicro's awesome SC-750A case, a full-size tower with a multitude of fan options. Twin 8cm fans fit into the front



Air entered the 750A's case along the arrow's path but was not sufficiently vented through the area around the power supply.



Though the 750A's optical drivers are staggered for better airflow, they still could have benefited from the optional drive bay fans. In their current config, the drives suffer from dead air zones.

bezel, a 10cm fan mounts above the power supply, and there are options for up to four 8cm fans alongside the drive bays. Notably absent were an 8cm fan to blow air down onto the CPU and a 4cm fan mounted on the back of the case, directly behind the CPU. We chose this system because it is positively stuffed with peripherals, including three hard drives, two optical drives, eight fans, four PCI cards, and a GeForce DDR warming the AGP slot.

The first thing we noticed about the SC-750A was that the triple CPU/chipset fan combo created massive air disturbance. The fans would throw up small funnels of smoke as they sucked air down into the CPU. The entire area over the CPUs and chipset was a turbulent mess while the system was on. This, of course, doesn't necessarily aid in cooling, since it could simply mean that the same hot air was pushed around the case. In order for the smoke to exit, it had to flow from the front of the case, through the turbulent air above the CPUs, and into the power supply, where it was evacuated—a nearly impossible course. We think that either installing a 4cm back-mounted fan behind the CPU or switching the direction of airflow on the three CPU fans could have mitigated the terrible airflow in the CPU area.

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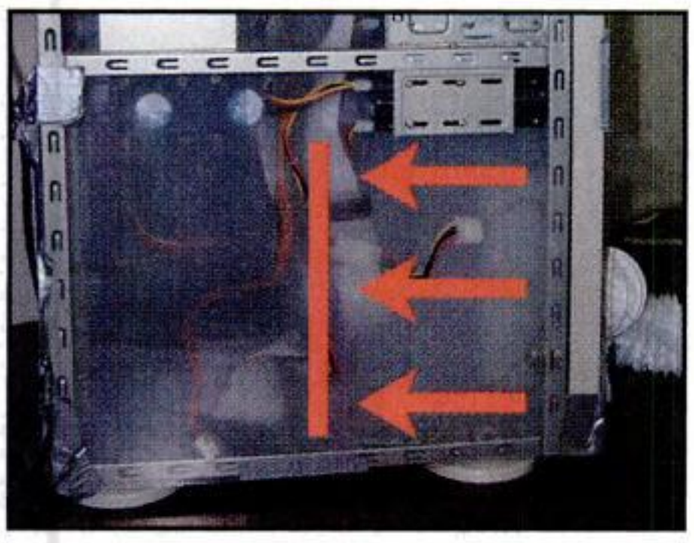


A rat's nest of drive cables in the 750A is blocking almost all the air flow from the two front bezel fans.

Our test also confirmed the need for the more svelte cables that Serial ATA will bring us. Our 750A hid a veritable rat's nest of SCSI, IDE, and floppy ribbon cables that acted like a wind drogue, blocking the flow of air from the two front fans. Serial ATA's I/O cables, which should be about 3/4-inch in diameter, will be a welcome change in PCs.

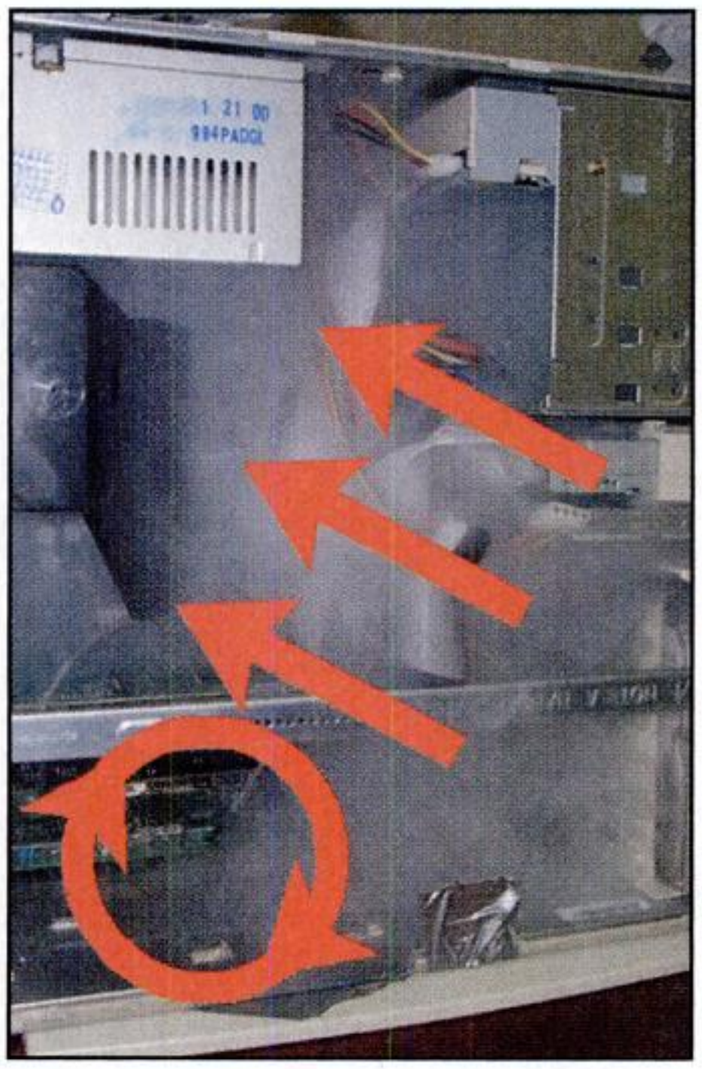
Another problem we encountered in our tests had to do with dead air surrounding peripheral cards. Because the I/O cables prevent the air moving through the bezel fans from blowing directly onto the PCI cards, air movement in the PCI card area was stilted at best. Although the SC-750A alleviates some of this by including passive vents near the PCI cards, in our opinion, these weren't adequate for cooling today's hot peripherals.

The one area in which the SC-750A is properly configured is storage placement. The two optical drives are wisely mounted with plenty of room between them, encouraging airflow. If you have problems cooling drives, the 750A actually lets you mount fans on both sides of the drive bay. If your case has that option, we recommend installing the fans, particularly if you're running a lot of hot, high-speed drives.

We didn't expect the auxiliary fan mounted above the power supply to do much good, because we thought that the power supply fan would "steal" most of the air before it reached the top of the case. To test our theory, we ran the system both with and without the top fan enabled. Surprisingly, airflow was reduced considerably when the top fan was disabled, causing the air to bog down in the lower half of the case. When the top fan was on, air moved well from the lower intakes and over the drive bays before it was blasted out of the system. To see if we could mimic this action for those of you with mid-tower cases, we shut down the top fan and added PC Power and Cooling's Turbo Cool 2X, an additional fan that screws to the back of the power supply and is purported to increase the airflow through your system. The Turbo Cool's high-velocity fan made quite a difference in clearing the smoke, working almost as effectively as the auxiliary fan that lives above the power supply.

CASE STUDY 2: DELL XPS B733R

The second system we ran through the grinder was our baseline Dell test rig. It's outfitted with the standard Palo Alto case employed by Dell (and a number of OEMs), a 733MHz Pentium III, a plain-jane CD-ROM, floppy, two fans, and 128MB of Direct RDRAM memory. The Palo Alto is designed for power users who don't need a ton of expansion capabilities. Like most OEMs using the Palo Alto case, Dell relies on a custom-fitted "wind tunnel" that reaches from the CPU to an 8cm fan mounted inside the back of the case. The wind-tunnel design has the advantage of directly venting air from the CPU rather than just moving it around inside the case. It also allows the use of larger fans that spin at lower RPMs—and thus produce lower decibel levels.



In the Dell's case, cool air is sucked in past the hard drives, making a beeline for the wind tunnel where it is vented. However, a massive dead spot covers the PCI cards.

With only the wind-tunnel fan and the power supply fan aiding exhaust, how well does this system work when compared to a system with a zillion fans? It turns out that the wind tunnel performs much better than we expected. In the Dell, smoke moved at a good clip from the lower front bezel, past the hard drive, and out through the gaps in the wind tunnel. The pattern was much clearer than the wind chop that affected the configuration on the SC-750A case. As is to be expected in a case with few fans, there were several dead-air spots, specifically around the lower PCI slots and drive bays. Of course, the Palo Alto case is much smaller and more cramped than the 750A and doesn't have the option to evacuate air above the power supply.

THE BOTTOM LINE

While these tests aren't entirely scientific, we can make several conclusions based on the results we've reported. We found that having more intake fans than exhaust fans doesn't improve airflow. It's more valuable to have multiple exhaust fans drawing air in than to rely on a single power supply fan to blow air out. We recommend that you configure your case to blow as much, or more, air out than it sucks in.

If you have a hot AGP card or PCI card that generates excess heat, some form of active cooling around the expansion slots could improve your case's climate.Consider a fan that fits into a spare expansion slot. They're usually underpowered, but anything that gets air moving in this area is good.

We can't wait for Serial ATA to appear on the scene. Until then, consider using zip ties or velcro straps to lash down the cables in your case. If you have lots of ribbon cables floating around your system, consider buying some pre-split IDE cables that are a little more aerodynamic. Check **www.hardocp.com** for more info on rounded IDE ribbons.

Without the proper exhaust system, CPU fans do little more than move hot air around the case. If you have an unused fan mount behind your CPUs, take advantage of it by adding another fan that blows air out. If you don't want to fool with adding additional fans, consider picking up a power supply equipped with a better fan; we recommend something from PC Power and Cooling.

If nothing else, our little experiment proved that brute force isn't necessary when cooling your PC. A well-designed cooling scheme utilizing two fans is just as effective at ventilating your case as adding 15 fans with no overall plan.

Now, back to the Lab to design a killer *Maximum PC*-branded wind tunnel!

—Gordon Mah Ung

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ASK THE DOCTOR

Symptom | Diagnosis | Cure

It always starts innocently enough—you want to update your video drivers, for instance. Next thing you know, you smell smoke, your PC won't boot, and that sinking feeling overtakes your gut. Doh! Don't panic—The Doctor is here to help. If you're experiencing a PC meltdown, send a note to doctor@maximumpc.com. We can't help everyone, however. Please consult the *Maximum PC* forums or vendor tech support if you need assistance ASAP.

Partitioning Possibilities

I have considered partitioning my 20GB drive into three parts: First, a 5GB partition for the OS and OS-related applications; next, a 5GB partition for application software such as games and other programs; and, finally, a 10GB "storage drive." Is it worth the time and effort of setting up my system like this? Will this kind of setup possibly prevent the conflicts that some application software cause?

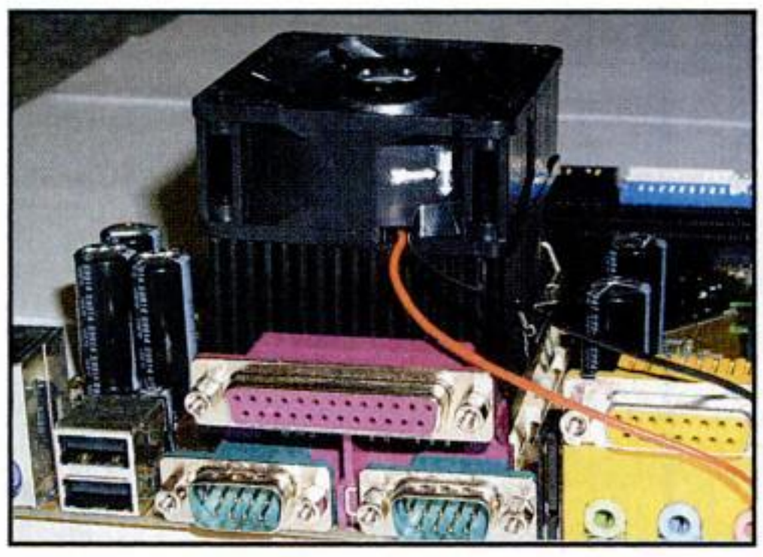
—Jaryl Harrison

The Doctor always likes to break up large drives into smaller partitions. The reason is simple: When Windows decides to go south for the winter, reinstalling the OS is easier (in our experience) if the installation files are already sitting on your PC. Just back up your essential files that reside on the OS partition, then format and reinstall Windows. This way, you still have all of your applications in a nice, safe spot—barring total drive failure, that is.

The one thing to remember, though, is that when you do reinstall Windows, you will either have to reinstall the apps you used before or create new shortcuts in your C:\Windows\Start Menu\Programs menu. If you create new shortcuts, you end up with a Registry that you may have to baby-sit for a while until you teach it what programs are associated with what file extensions. The easiest way to "teach" Windows 98 is to select the file you want to use and then shift/right-click on it. A drop-down menu of options will open. Select "Open With" and a new window will open. Now select "Other" at the bottom, then move to your Applications partition and pick which app you want to be associated with this extension. Be sure to click the check mark on the left of this window or the settings won't take.

> **For most tweakers, the above procedure isn't a problem, but...**

For most tweakers, the above procedure isn't a problem, but for the average low-level user, it's easier to just reinstall all of your software. This means backing up the files on your Application drive that may be overwritten by installation of the applications. This reinstallation strategy is far easier and allows Windows to create Registry settings on its own. Whichever way works best for you is fine. Just be sure you have adequate backup protection if you choose this method.



Most fans have an airflow indicator on them.

Heatsink Fan Direction

This question has bothered me for some time: When placing a fan on a CPU, should it blow air onto the chip or away from the chip? The answer seems obvious, but there seems to be some debate on it. So, which way *should* the fan blow?

—Leo Pollock

Well, Leo, you have to consider the big-picture schema of your case, peripherals, and other cooling devices. Y'see, the airflow inside your case is one big, complex weather system, and chaos theory dictates that gentle eddies in one region of your case can affect microclimates in other regions of your case. In other words, you need to consider more than just the small pocket of air surrounding the CPU. That stated, I've consulted with the big processor companies, and I'm ready to give you the general lowdown. It's best to blow cool air *onto* the heatsink, which is contrary to what a lot of people do.

One of the most compelling reasons to blow air onto the heatsink is that in most situations, the CPU fan draws cooler air from outside—usually from an opening on the side or back of the case. This air is cooler than the air that would be drawn across the heatsink from inside the case. You want your air coming from outside, because the air inside your case has been heated by other peripherals and has grown stagnant because of cabling blockage.

Unfortunately, not all cases have a direct, fan-driven air channel from outside the case to the CPU. In these situations, depending on other

This month:

- Partitioning Possibilities
- Heatsink Fan Direction
- VIA's 4-in-1 Drivers
- BIOS Voltage Question

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variables, it may make more sense to pull heat off of the heatsink instead of pushing air onto the heatsink. Check out the Lab Notes section on page 62 for more insight on internal airflow in cases.

VIA 4-in-1 Drivers

I'm having problems with AGP on my Asus A7V motherboard. My friend has the same board with the same videocard (an ATI Radeon) and I can't get the same frame rates as he does on some of my games. What's the deal here?

—Gary Brison

> **The Normal mode actually throttles back the available bandwidth to a measly 66MHz, as opposed to 133MHz (for AGP 2x) or 266MHz (for AGP 4x).**

Lucky for you, Gary, we've seen this problem before. Your A7V is based on the VIA KT133 chipset. When you downloaded and installed VIA's 4-in-1 motherboard drivers, you chose the Normal AGP driver instead of the Turbo version. While we don't usually condone anything that might add to the already frightening instability of some VIA boards, we recommend enabling Turbo in the AGP drivers. All you need to do is reinstall the 4-in-1 drivers, this time choosing the Turbo mode during installation.

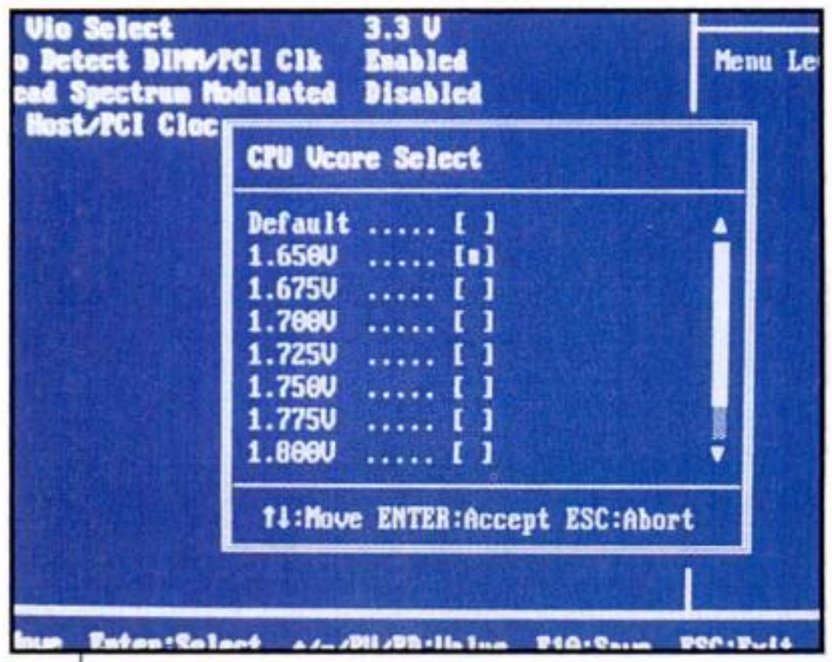
The Normal setting forces the mobo and graphics card to run at AGP 1x speeds, while the Turbo allows the videocard to use its default AGP setting. The Normal mode actually throttles back the available bandwidth for your card to a measly 66MHz, as opposed to 133MHz (for AGP 2x) or 266MHz (for AGP 4x). Even though no game developer is using textures from AGP memory, you should see a performance hit from AGP 1x.

Why would you ever want to use Normal mode? Users of early Athlon systems with original GeForces experienced crashes in 3D mode, and this was remedied by slowing down the AGP bus. While we applaud VIA for making it easy to enable the GeForce-safe mode, we jeer it for needlessly slowing down users who don't need to slow down the bus. To avoid confusion, VIA should call Turbo mode "Normal" mode, while the 1x mode should be labeled "Compatibility" mode. Either way, just remember that Turbo equals full AGP potential.

BIOS Voltage Question

Your magazine keeps mentioning that when putting a Coppermine P-III (or Celeron) in a BX motherboard, the board must support the CPU's voltages. Well, how do I figure out if a certain BX board supports the Coppermine voltages? Is there a program that will tell me the supported voltages of my chipset? Is there a number on the chipset itself? I have a BX board and I want to figure out my upgrade possibilities.

—chaos450



Check your BIOS for available voltage settings.

A Coppermine Pentium III runs at 1.65v for the lower-clocked procs and at 1.75v for the 933MHz to 1GHz procs. There aren't any programs available that tell you the voltages your board supports, although, if you check your motherboard manual, you can find out what voltages the board will use. An alternative to this is to go to the mobo maker's site and check the specs for your board. You might want to also try checking the most recent BIOS information on the board; sometimes this will indicate whether Coppermines are supported.

If you're unsure of your board make and model, you can crack open the case and look at any identifying numbers, then head over to the Motherboard Homeworld at **www.motherboard.org** and search through its extensive database of motherboards. Armed with this information, you should be able to find the manual that shows you what voltages your board supports.

If you're buying a new board, simply look for the "Coppermine Ready" label. This way all of your voltage troubles are eliminated. ✹

second opinions

READERS SHARE THEIR HOME REMEDIES

Norton Name Change

Tell the doctor he/she made a blunder when Jim Nance was told to use "Disk Doctor" from Norton *System Works* to defrag his hard drive. "Speed Disk" is the defrag master and "Disk Doctor" diagnoses problems. Sorry, Doc.

Avid Reader and Loyal Norton User, D. G.

Yeah, we goofed. Try not to rub it in. Even at our best, we sometimes let things slip by. For the record, we didn't smoke crack beforehand.

DMA Double Dose

Your solution to Vladan Milenkovic's problem was rather vague, and since I resolved this issue by other means, I thought I'd pass my experience on. After installing Creative Lab's Liveware 3 for my Sound Blaster Live! soundcard, DMA immediately became disabled on my system. After much frustration, the problem was finally determined to be Sound Blaster 16 Emulation (which uses two DMA channels, usually the same one for 8-bit and 16-bit). Disabling SB16 Emulation allowed me to re-enable DMA.

—Bill Zibbell

Thanks, Bill. After reading Vladan's letter, we assumed incorrectly that he had tried playing with different DMA-enabled devices. We were wrong. The SB16 Emulation does indeed disable DMA options on most systems. Unless you're running DOS apps, disable SB16 Emulation first.

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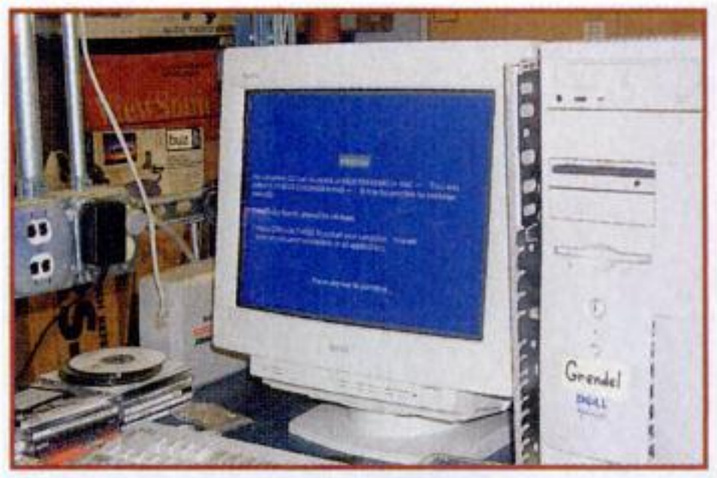
REVIEWS

NO APPLES FOR YOU!

Don't get upset, but this month we decided to pull our review of Apple's new dual-500MHz G4 machine to make way for two other system reviews. We know you wanted to see how Apple's top-of-the-line rig fared against our top-of-the-line Dream Machine 2000 (evil snicker), but don't despair. The review should appear next month.

Speaking of orphaned Apple products, we also received a breathtaking 22-inch Apple Cinema Display, which we plan to review next month, as well. Naturally, we had to pimp the gorgeous flat-panel in front of our editorial counterparts at *MacAddict*, since we received the display before they did. The *MacAddict* crew took it in stride, however, and even lent us their *Unreal Tournament* CD for (cough) testing the monitor's image quality.

—JOSH NOREM, REVIEWS EDITOR



DUPED BY BSOD

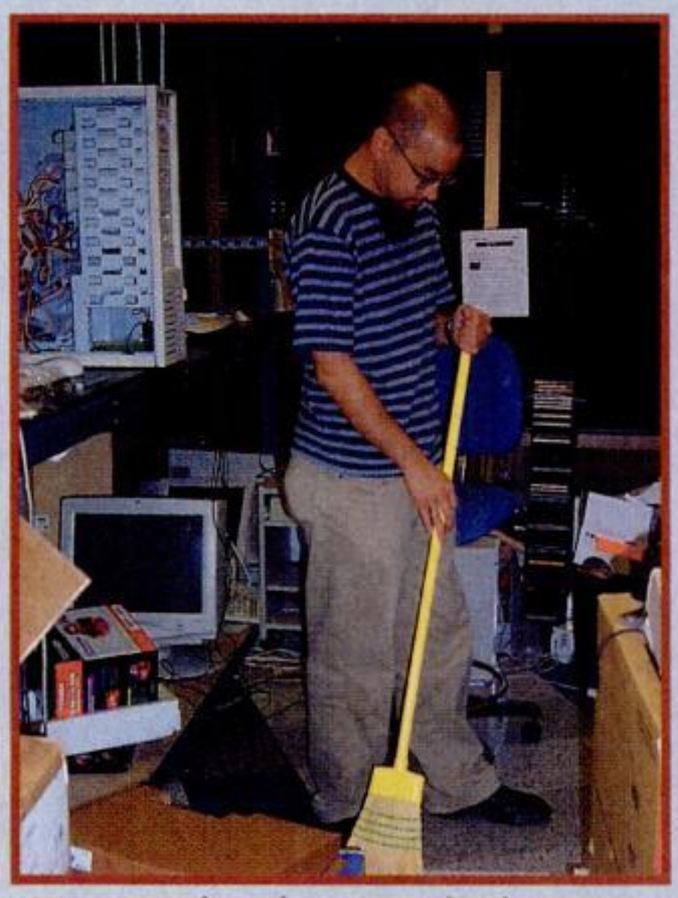
This month, a certain staffer (Josh) had fun installing a Blue Screen of Death screensaver on all of our computers. The only staffer who fell for the prank was Geoff, who rebooted his PC three times in a row in a pathetic attempt to solve his crash woes. Others knew the screen was fake and uninstalled it, but the wily prankster (Josh) snuck back, and installed it again. You can imagine how confused everyone became upon seeing the dreaded BSOD for a *second* time! If you work in an office or have easy access to a friend's PCs, check out **www.hardocp.com/files/cool_stuff/bluescreen.zip**.

A Reader Comes a-Callin'

We've said it before, and we'll say it again: If you're in the area, feel free to stop by the *Maximum PC* offices for a little hobnobbing. *Just make sure you call first!* We don't get many visitors, so we usually roll out the red carpet. Don't believe us? Ask Frederick Vong, who recently paid us a visit.

We welcomed Fred with open arms, and offered him a gift basket stocked with two bottles of Old English 800, an Aureal Vortex soundcard, and an Adaptec 2930 SCSI controller. Naturally, Fred was overwhelmed by our generosity.

The first stop on the *MPC* tour is the Lab. After Fred tinkered with our test machines, he asked to see the holy incarnation known as the Dream Machine. Fred was speechless in its presence.



We wrapped up the tour with what we affectionately call the "Be a Real Maximum PC Employee" stage. Fred missed a few spots, but otherwise did a fine job.

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A behind-the-scenes look at the Maximum PC Lab and the gearheads who work in it.

RIGHTEOUS LINK: WWW.TECHDEALS.NET

TECHDEALS
your guide to technology bargains...

This site lists smoking deals on all the best PC hardware and is a must-see for all you penny pinchers out there. A random viewing of the site found a 32MB GeForce2 card for $108, an unlocked AMD Thunderbird Athlon guaranteed to run up to 1GHz for $250, and a 30GB Maxtor DiamondMax Plus 7,200rpm hard drive for $170. Wowsa! The only catch is that many of the deals are available for a limited time, so check back frequently for the latest offers.

They're Biting Our Lines!

They say that imitation is the most sincere from of flattery, but this is ridiculous. In its September issue, one of our competitors ran exceedingly familiar cover lines. "Ultimate Ugrades"? Hmmm... Didn't *Maximum PC* run an Ultimate Upgrade Bible in its August issue? "Build Your Dream Machine"? Very curious, indeed. Doesn't *Maximum PC* run its annual Dream Machine feature every September?

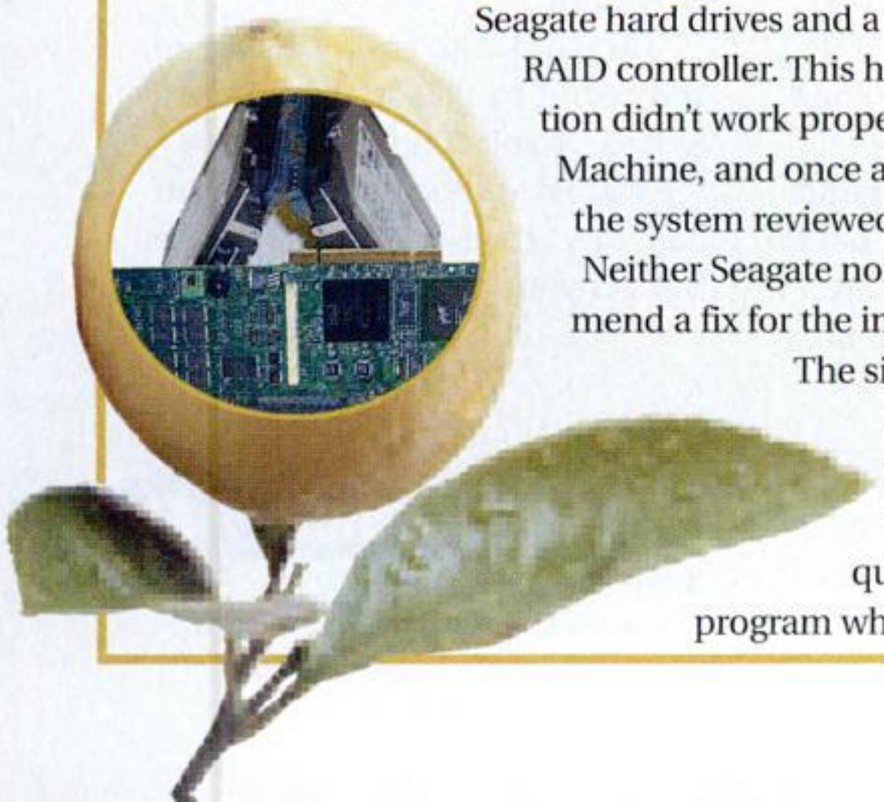
We can't begrudge the competition for running these cover lines, even if they were, in fact, lifted from *Maximum PC*. Our cover concepts have helped us sell an unusually high number of newsstand issues lately, so it makes perfect sense for another publication to attempt to duplicate our success.

Have other magazines published articles that you'd like to see improved upon in *Maximum PC*? If anyone has any ideas about how we can keep up with the Joneses, please send them to **workharder@maximumpc.com**. We'll report next month on how readers think we could stay competitive.

Lemon of the Month

SEAGATE/DPT RAID

If you like troubleshooting broken PCs, buy some SCSI Seagate hard drives and a DPT Decade RAID controller. This hardware combination didn't work properly in the Dream Machine, and once again failed us in the system reviewed on page 58. Neither Seagate nor DPT can recommend a fix for the incompatibility. The situation makes us wonder whether either company has any quality-assurance program whatsoever.



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21 PRODUCTS REVIEWED!

Hardware

- Creative Labs Annihilator 2 Ultra 72
- Hypersonic Sonic Boom PC 74
- Wireball Assassin PC ..76
- D-Link DI-701 78
- WebRamp 700s 78
- NetGear RT311 78
- Asus A7V 80
- MSI K7T Pro 80
- Tyan Trinity KT (S2390) .80
- All-in-Wonder Radeon .83
- Cooler Master ATC-200 84
- Antec SX1030 84
- Inwin Q500 84
- QBE Cirrus tablet 86
- Palm m100 87
- Microsoft Cordless Mouse 88
- Logitech Optical Mouse 87

Games

- Evolva 89

Applications

- International Quality Software SAW32 Lite ..90
- Syntrillium Cool Edit Pro 90
- Sonic Foundry's Vegas Video 90

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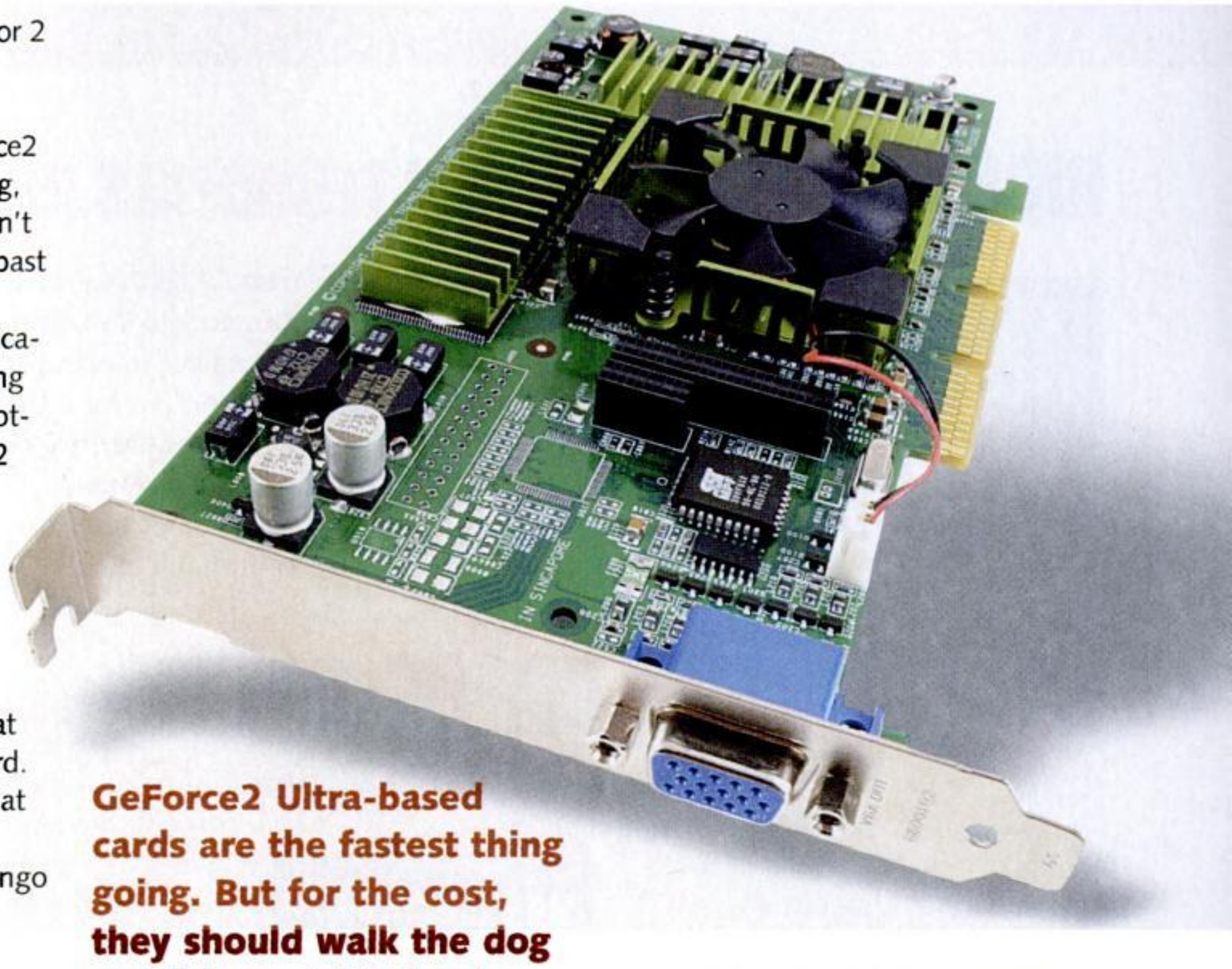
Annihilator 2 Ultra

(SIGH) nVIDIA TAKES TOP-SPEED CROWN—AGAIN



GeForce2 Ultra-based cards are the fastest thing going. But for the cost, they should walk the dog and take out the trash.

PLUSES
- Fastest 3D
- Green memory heatsinks
- Did we mention it's really fast?

MINUSES
- Costs as much as a cheap PC
- Mediocre DVD playback
- Average visual quality

What does the Annihilator 2 Ultra (**www.creativelabs.com**) offer that the recently released GeForce2 GTS doesn't? One thing, folks—faster memory. If you haven't been cryogenically frozen for the past six months, you've undoubtedly noticed how every hardware publication and web site has been prattling on endlessly about the memory bottlenecks that the original GeForce2 suffers. With its DDR memory running at 166MHz, the GeForce2 chipset can push more triangles than the memory can handle, so a bottleneck occurs. The solution, obviously, is to use faster memory, and that's just what nVidia has done with the Ultra card. Apparently the kids in purchasing at nVidia have an inside source (or a large slush fund) and scored a mongo supply of 230MHz DDR SDRAM. Goodbye, memory bottleneck!

So besides the memory boost, what else is new? Nothing! If you were expecting new features or ultra-cool whizbangs from the Annihilator 2 Ultra, think again. nVidia simply turned up the clock and memory speeds of the GeForce2 chipset with the intent of eliminating the memory bottleneck and letting the card fire on all four pistons (finally). The engineers at nVidia cranked the Ultra's core clock from 200MHz to 250MHz, giving the Ultra a theoretical fill rate of 1GigaPixel/sec and its four dual-texturing pipelines a maximum texture fill rate of 2GigaTexels/sec.

THE SPECS

MEMORY	
64MB DDR SDRAM	
CORE CLOCK	
250MHz	
MEMORY CLOCK	
230MHz	
RAMDAC	
350MHz	

BENCHMARKS

CREATIVE LABS ANNIHILATOR 2 ULTRA

Quake III 1024x768 demo001	92.7
Quake III 800x768 Quaver	93.1
MDK2	104
3DMark Game 1 Medium Quality 16-bit	91.3
3DMark Game 1 Medium Quality 32-bit	85.3
Expendable	74.2
SYSmark 2000	606

Benchmarked on our Dell 733MHz Pentium III test system using version 4.12.01 of the Creative Labs drivers. V-Sync is disabled in every benchmark.

During lab testing, the Ultra gave every card we've ever benchmarked the red-headed stepchild treatment, including the 64MB Radeon we reviewed last month and awarded a Kick Ass to. In fact, the Ultra almost doubled the benchmark scores posted by the Radeon. With *Quake III* scores consistently in the mid 90s, the Annihilator 2 Ultra takes the speed crown, with no real competition on the horizon until the 3dfx V5-6000 emerges from the vapor.

Although it's certainly faster than the Radeon, the Annihilator 2 Ultra's image quality isn't as good. The Radeon smacks GeForce-based cards around in this department, in both 3D and 2D. The Radeon produces more vibrant colors and sharper overall images than the Annihilator 2 Ultra. The Annihilator can't compete with the Radeon in the DVD playback department, either. While DVD playback on the Ultra is tolerable, it doesn't compare to the Radeon's, which is just two steps shy of a dedicated hardware MPEG-2 decoder. (Be sure to check the Videocard section of Maximupc.com for image quality comparisons between the GeForce2 Ultra and the Radeon.)

The other downside to the Annihilator 2 Ultra is its cost. Extreme performance comes at an extreme price. No one should expect 64MB of super-fast memory to come cheap. Expect to shell out somewhere in the neighborhood of $500 for this beast, a full hundred clams more than a 64MB GeForce2 or Radeon.

This card is so fast, we had no choice but to give it a Kick Ass Award. If you simply must have the fastest videocard money can buy, the Creative Labs Annihilator 2 Ultra is your daddy.

—Will Smith

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Hypersonic Sonic Boom A/V

SONIC BOOM BREAKS BENCHMARK BARRIERS

The Sonic Boom carries a top-flight payload of killer components.

When Hypersonic's Sonic Boom A/V Station arrived, we were surprised it didn't have five dead P-IIIs stenciled on its side, because this box is an Intel-killing flying ace.

Packing more firepower than some third-world nations, the Sonic Boom (**www.hypersonic-pc.com**) is loaded with a star-studded list of components, including a 1GHz Thunderbird Athlon, a 64MB Hercules GeForce 2 card, a Sound Blaster Live! Platinum, a Real Magic Hollywood Plus MPEG card, and a Plextor 12/10/32 burner. The icing on the cake is an eight-piece S4 Midiland speaker system and a perfectly flat, 19-inch aperture grille monitor.

During dogfights, the Sonic Boom shot down previously tested T-bird systems from Axis and Polywell, and would have been Top Gun if it weren't for the Wireball Assassin system reviewed on page 76. The Assassin moved in for the kill in gaming benchmarks, but the Sonic Boom was still able to pull down record-breaking scores in *bootMark*, *Photoshop*, and *MusicMatch Jukebox*. Incidentally, its *bootMark* rating of 546.8 is the highest score we've ever seen from a 1GHz T-Bird (all others topped out at 538).

The Sonic Boom lost to the Assassin in *SYSmark*, but the Boom's no slouch. Armed with the 64MB Hercules card and the latest Detonator 3 drivers, it humbled the 1GHz T-Bird systems from both Polywell and Axis in *Quake III*. Only the Assassin, with its 64MB Gladiac card, outscored the Sonic Boom in Carmack Country.

In hard drive speeds, the Sonic Boom held its own with a single 30GB IBM Deskstar 75GXP. It doesn't compare to the ATA/100 RAID rigs, but it's the most awesome IDE experience you can get from a single drive. Though the VIA KT133 chipset doesn't natively support ATA/100, ASUS added it by bonding a Promise ATA/100 chip to the A7V motherboard.

Hypersonic may have aimed too low in its case selection. Although the company saw fit to include a 300-watt power supply from Antec, Hypersonic built the Sonic Boom with a mid-tower case, and amid the Zip, floppy, optical drives, and Creative Labs Live Drive, there's almost no room for expansion. Hypersonic made sure its case was well-vented, however, by using two 80mm fans to circulate air from front to back. Another two 80mm fans are mounted above the PCI/AGP slots to aid cooling. We dig the idea, but the fan mounts are slightly Mickey Mouse.

The Sonic Boom beats the Assassin in the multimedia realm, packing a Real Magic card with remote control, 12x DVD-ROM, and Dolby Digital 5.1 speakers. Together they allow the Boom to double as an incredible home theater system. The only ding against the setup as a whole is the speakers' inability to play video games in quad-mode. It's a slight disadvantage, and gamers may want to pass on the speakers in favor of another brand.

Despite its minor flaws, the Sonic Boom delivers kick ass performance.

–Gordon Mah Ung

UNDER THE HOOD

THE BRAINS

CPU	AMD Athlon Thunderbird 1GHz
L2 cache	256K full speed
RAM	256MB PC133 SDRAM (1.5GB max)
Motherboard	Asus A7V
Drive bays	Four 5.25-inch, three 3.5-inch (one free)
I/O ports	Five USB I Two serial I One parallel I Two PS/2 I S/PDIF in I S/PDIF out I MIDI in MIDI out I Two line-in ITwo line-out I Headphone out
DISPLAY	
Video	Hercules GeForce2 GTS 64MB DDR SDRAM
Monitor	19-inch Mitsubishi DiamondPlus 91 (18-inch viewable)
Refresh@ max res	75Hz@1600x1200
STORAGE	
Hard drive	30GB IBM 75GXP ATA/100 7,200rpm
DVD	12x Toshiba SD-M1402
CD-RW	Plextor 12/10/32
Removable	100MB Iomega Zip
NETWORKING	
NIC	3Com 10/100 NIC
SOUND	
Soundcard	Creative Labs SB Live! Platinum
Speakers	Midiland 8-piece S4 8200 with Dolby Digital 5.1

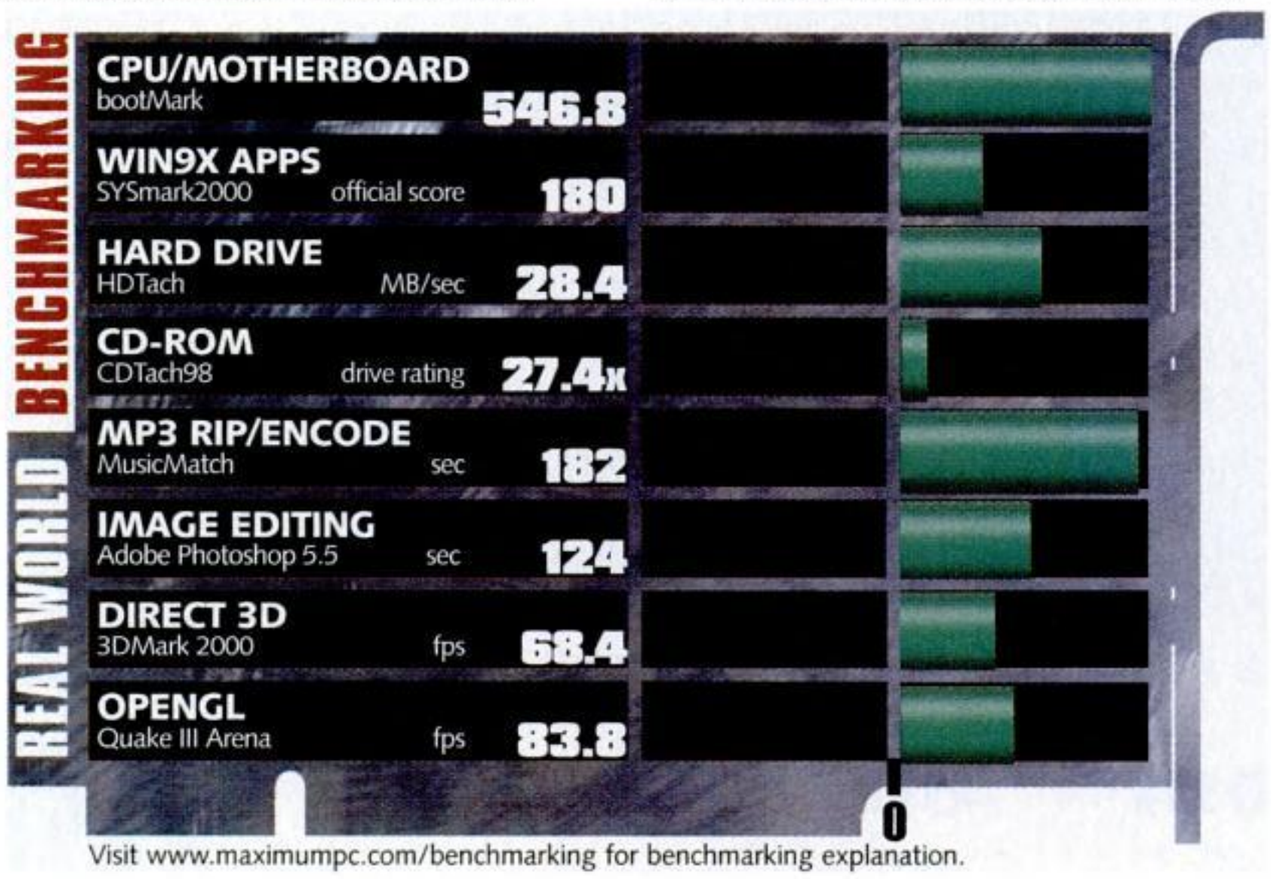
THE BUNDLE

Microsoft Windows Millennium I Roger Wilco I *Game Commander SE* I Voice Assist I Adaptec *Easy CD Creator* *Plex Manager 2000* I Power DVD

BOOT 1:42 DOWN 0:04

PLUSES
- Top-of-the-line hardware
- Killer aperture grille monitor
- Kickin' 5.1 Dolby Digital surround system

MINUSES
- Perplexingly slow in *SYSmark*
- Packed case



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MAXIMUM PC VERDICT 9

$3,500 ($2,980 w/o monitor)
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EXPANSION NOTES

With only two free PCI slots and zero external drive bays available, there's not much room left to grow in the Sonic Boom. But then again, what else do you need?

EXPANSION MAP

AGP:	DDR GeForce2
PCI:	Hollywood Plus
PCI:	Free
PCI:	SB Live!
PCI:	NIC
PCI:	Free

IRQS

00 System timer	**11** Real Magic card
01 Keyboard	**11** GeForce2
02 Interrupt controller	**12** PS/2 mouse
03 Creative SB Live!	**13** Numeric data processor
04 COM 1	**14** Bus master controller
05 NIC	**14** Primary IDE controller
05 USB host	**15** Secondary IDE controller
06 Floppy	**15** Bus master controller
07 LPT1	
08 System CMOS	
09 ACPI bus	
10 Promise IDE controller	

DMAS

01 SB16 emulation	**04** DMA controller
02 Standard floppy	**05** Creative SB16 emulation
03 ECP printer port	

Cool cards. Although the mounting system is on the cheesy side, these dual 80mm fans keep the PCI cards downright chilly.

Golden orbish. Run a 1GHz Athlon without cooling and you can fry it in about eight seconds, so you can see the need for this Golden Orb.

One less DIMM. Hypersonic packs 256MB of PC133 SDRAM in the Sonic Boom, but leaves less room for expansion by going with two 128MB DIMMs instead of a single 256MB DIMM.

Real surround sound. They don't pump out the volume of the Klipsch ProMedia, but Midiland's 8200 speakers deliver killer 5.1 Dolby Digital sound.

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Wireball Assassin

THE COMPETITION HAS BEEN EXECUTED

Newcomer Wireball blew us away with its hardware-heavy Assassin.

PLUSES
- Top-of-the-line hardware
- Killer aperture grille monitor
- Klipsch ProMedia Sound
- Lots of expansion

MINUSES
- Packed case
- Cabling nightmare
- No 5.1 surround sound

After spending time with the Hypersonic Sonic Boom reviewed on page 74, we began to think Thunderbird systems couldn't get much better. We were wrong. Wireball's Assassin (**www.wireball.com**) arrived about two weeks after the Sonic Boom and immediately established itself as the fastest Thunderbird system in captivity.

The Assassin's arsenal of covert weapons includes a 1GHz Thunderbird Athlon, a 64MB Elsa GeForce2 card, a Sound Blaster Live! Platinum, a Pioneer 16X DVD drive, and an ATA/100 RAID array with two IBM Deskstar 75GXPs. The crowning glory is the tremendous Klipsch ProMedia speakers and perfectly flat, 19-inch iiyama monitor. More so than any other system we've looked at recently (the Sonic Boom excluded), every single component in the Assassin rocks, making this system a hardware tour de force.

Given its lust list of high-end hardware, Assassin's incredible benchmark performance comes as no surprise. This hired hitman slammed the Sonic Boom in our *SYSmark* test, gutting it by a full 15 points. The Assassin then carved through the *HD Tach* scores, walloping the Sonic Boom to the tune of 10MB/sec in sequential read speeds. The Assassin's unfair advantage is the two IBM 75GXP hard drives that are connected to the onboard ATA/100 RAID controller. The Sonic Boom fought back fiercely with a slightly better *Photoshop* score, but the Wireball fragged it in *Quake III* by a full 3fps.

Speaking of *Quake III*, this machine is the first machine ever to finish the unofficial *Quake III* loop at 2048x1536. In fact, the only thing that broke the Assassin was *3DMark* at 1600x1200 with all the settings at max. The Assassin's stability is certainly due in part to the exorbitant number of fans—10 to be exact—littering the enormous Addtronics case.

The full server tower is great for future hardware expansion, but the noise of the fans whirring make a Hoover vacuum cleaner seem quiet. To keep the fans, drives, and processor running properly, the Assassin includes a 425-watt electrical substation from PC Power & Cooling.

The Assassin fails to match the Sonic Boom in multimedia features. Wireball left out a hardware MPEG decoder, and, although the Klipsch speakers are mind-blowing, they don't match the 5.1 Dolby Digital capability of the Midiland speakers included with the Sonic Boom. We also have a beef with the Assassin's DMA settings, which were all screwy when we received the system, requiring us to adjust them manually. And the interior cabling is as tangled as a hippie's hair, giving the system a homemade look. That's not a compliment.

Aside from the slight niggling problems with the DMA settings and the lack of a hardware decoder card, this is truly a superior system. The only unknown quantity in this system is the maker itself. Wireball is a complete newcomer to the PC market, and we're told that it can crank out only about 100 PCs a month. Reps also tell us Wireball cares more about quality than quantity, and judging from the Assassin's hardware and performance, that's no lie.

—Scott Tarr

UNDER THE HOOD

THE BRAINS

CPU	AMD Athlon Thunderbird 1GHz
L2 cache	256K full speed
RAM	256MB PC133 SDRAM (1.5GB max)
Motherboard	Abit KT7-RAID
Drive bays	Six 5.25-inch (two free), two 3.5-inch
I/O ports	Five USB I Two serial I One parallel I Two PS/2 I S/PDIF in I S/PDIF out I MIDI in I MIDI out I Two line-in I Two line-out I Headphone out

DISPLAY

Video	Elsa GeForce2 GTS 64MB DDR SDRAM
Monitor	19-inch iiyama Visionmaster 450Pro (18-inch viewable)
Refresh@ max res	85Hz@1600x1200

STORAGE

Hard drive	2-30GB IBM 75GXP ATA/100 in RAID 0
DVD	16x Pioneer DVD115
CD-RW	TDK VeloCD 8/4/32
Removable	250MB Iomega Zip

NETWORKING

Fax/modem	Linksys Etherfast 10/100

SOUND

Soundcard	Creative Labs Sound Blaster Live! Platinum
Speakers	Klipsch ProMedia V.2-400

THE BUNDLE

Microsoft Windows 98SE I Adaptec *Easy CD Creator 3.5*I Adaptec *Direct CD* I Cyberlink *Power DVD*

BOOT **1:09** DOWN **0:03**

REAL WORLD BENCHMARKING

CPU/MOTHERBOARD	bootMark	538.5
WIN9X APPS	SYSmark2000 official score	195
HARD DRIVE	HDTach MB/sec	40
CD-ROM	CDTach98 drive rating	30
MP3 RIP/ENCODE	MusicMatch sec	222
IMAGE EDITING	Adobe Photoshop 5.5 sec	127
DIRECT 3D	3DMark 2000 fps	70.2
OPENGL	Quake III Arena fps	86.7

Visit www.maximumpc.com/benchmarking for benchmarking explanation.

MAXIMUM PC VERDICT **9**

$4,680 ($4,030 without monitor) I Wireball

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EXPANSION NOTES

Although the Assassin is armed to the teeth, there are still four open PCI slots and two free drive bays. Upgrading will be a cinch in this monster machine.

EXPANSION MAP

AGP:	DDR GeForce2
PCI:	Free
PCI:	NIC
PCI:	Free
PCI:	Sound Blaster Live!
PCI:	Free
PCI:	Free

IRQS

00 System timer	**11** IRQ holder
01 Keyboard	**11** HPT ATA/100 RAID controller
02 Interrupt controller	**11** IRQ holder
03 COM 2	**12** PS/2 mouse
04 COM 1	**13** Numeric data processor
05 IRQ holder	**14** VIA bus master controller
05 GeForce2	**14** Primary IDE controller
06 Floppy	**15** Secondary IDE controller
07 LPT 1	**15** Bus master controller
08 System CMOS	
09 Sound Blaster Live!	
09 IRQ holder	
09 USB host controller	
10 IRQ holder	
10 Linksys adapter	

DMAS

02 Standard floppy	**04** DMA controller
03 ECP printer port	

A fan from a 747 airflow test lab. The PCI cards in the Assassin are kept cool by a massive 120mm fan. Wireball is serious about keeping this machine running as cool as possible.

Adding even more fans to this thing. With the large supply of fans to keep things cool, Wireball eliminates the possibility of the chipset overheating. Nice touch.

RAID rumblin' under the hood. Wireball took advantage of Abit's KT7 onboard RAID support by using two IBM 75GXP striped drives which reach a smokin' average of 40MB/sec read speeds.

The Godzilla case. The Addtronics case is larger than the average third-grader and sports nine drive bays, eight fan mounts, and a monstrous front bezel.

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Hardware Firewalls

KEEP YOUR NETWORK FREE FROM HAX0RZ

D-LINK

PLUSES
- Windows GUI
- Terrific installation guide
- Inexpensive NAT for 32 users

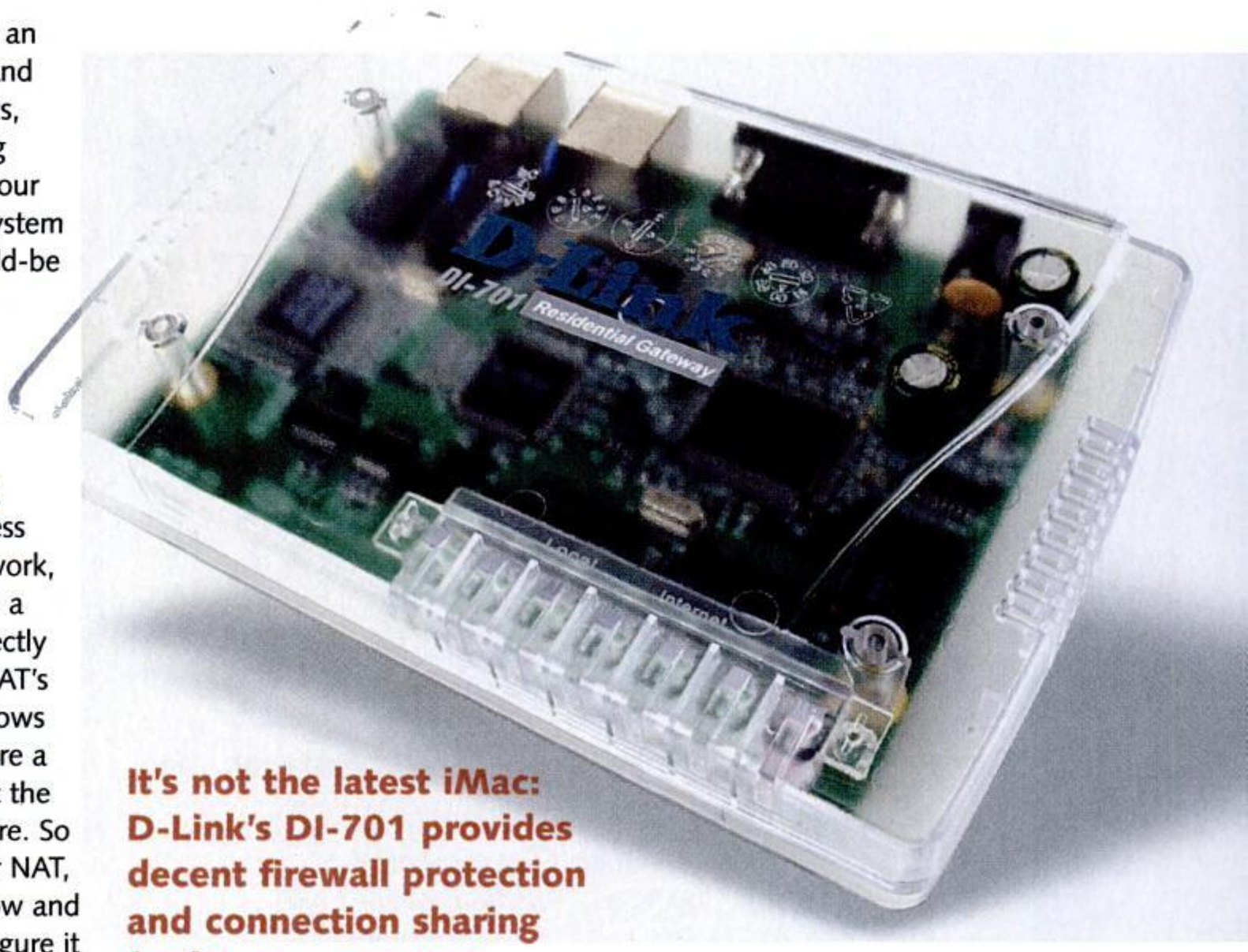
MINUSES
- No packet inspection
- No monitoring, logging, or rules
- Doesn't alert you to pre-existing trojans

WEBRAMP

PLUSES
- Access from any web browser
- Allows 2048 simultaneous connections
- Features-a-plenty

MINUSES
- No realtime monitoring
- Expensive
- Doesn't alert you to pre-existing trojans

Although software firewalls do an adequate job of closing ports and catching possible hacker attacks, security flaws in your operating system, applications, or even your web browser can make your system a sitting duck. To prevent would-be hackers, you need a hardware firewall employing Network Address Translation (NAT) technology. A NAT-enabled firewall uses Dynamic Host Configuration Protocol (DHCP) to assign a non-public IP address to the computers on your network, effectively placing your PCs on a private network that is not directly accessible from the Internet. NAT's pièce de résistance is that it allows multiple users on a LAN to share a broadband connection without the aid of resource-stealing software. So now that you feel the need for NAT, you're of course wondering how and where to find it. To help you figure it all out, we've rounded up three NAT firewalls that run the price gamut.



It's not the latest iMac: D-Link's DI-701 provides decent firewall protection and connection sharing for home users on a budget.

D-Link DI-701

D-Link's DI-701 Residential Gateway (**www.dlink.com**) is geared for the home user who wants simple installation and rock-bottom pricing. It's made of iMac-ish transparent plastic, houses a serial port for upgrading the firmware, and offers a WAN and a LAN port for connecting the unit to either a solitary PC or a hub. Rounding out the package is a simple and straightforward Windows GUI for configuring the DI-701 and changing the default password.

We connected the DI-701 to our cable modem-equipped PC without a hitch. Once installed, the DI-701's DHCP worked as advertised, dynamically assigning a private IP address to our workstation while obtaining all other network information directly from our ISP (static IPs can also be used). Out of the box, the DI-701 will allow modem sharing for up to 32 computers on your LAN. By default, the DI-701 closes local ports to prevent access from the outside, but the GUI can be used to open specific ports for certain online games, teleconferencing programs, or other server applications. If you don't have access to the GUI, you can telnet directly into the DI-701 and make any configuration modifications remotely. Concerning the firewall's ability to shield a PC, in testing the DI-701 using *Shields UP*, a popular online firewall tester, we received a message that our PC was on a private network and was "very secure against typical threats and discovery from Internet scanners."

The DI-701 has little else to offer as a firewall. It doesn't offer an activity log or monitoring capability, nor is there support for firewall rules. And unlike other hardware firewalls, the DI-701 doesn't include any form of advanced packet inspection, leaving DI-701 owners vulnerable to Denial of Service (DoS) attacks.

The DI-701's lack of additional features is somewhat offset by its price. For less than $100, it's the least expensive of the firewalls reviewed, but the absence of advanced packet inspection techniques makes the DI-701 a lackluster firewall at best. Budget-conscious users should purchase the DI-701 when modem sharing, not tight network security, is their primary concern.

Serious network administrators will love the power and ease-of-use of the WebRamp 700s.

WebRamp 700s

In terms of both price and performance, Ramp Networks' WebRamp 700s (**www.webramp.com**) is the heavy-hitter in this group. When you purchase the 700s, you purchase the hardware unit and a number of licenses; the total cost varies,

For definitions of Terminator words, check out the Terminator online at www.maximumpc.com.

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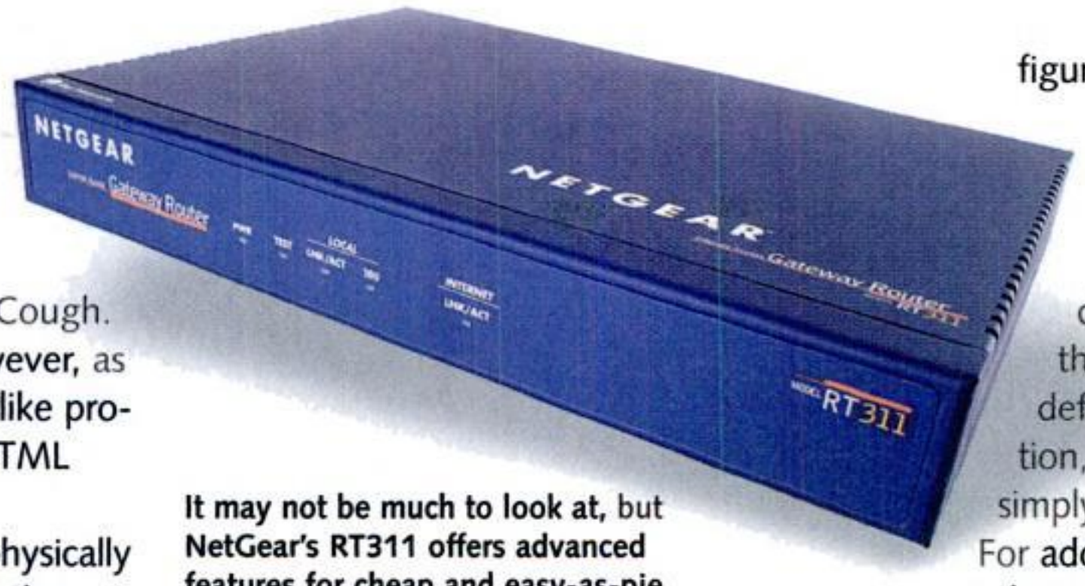
depending on how many licenses you require. The baseline, five-user unit we reviewed costs $400, with the unlimited-user version going for $1,100. Cough. It's money well spent, however, as the 700s offers Fort Knox-like protection and an excellent HTML management interface.

The WebRamp700s is physically similar in size and shape to the D-Link gateway, but features an all-black case that looks the business. The 700s has an abundance of LED indicators and sports a WAN port and four LAN ports. The extra LAN ports eliminate the need for a separate hub for LANs with less than five workstations.

As with the DI-701, the 700s provides you with NAT and DHCP, as well as a smorgasbord of protection and management features, including Java, ActiveX, and cookie blocking, plus Stateful Packet Inspection for detection and prevention of DoS attacks. The 700s can be programmed to send you security alerts via e-mail, can filter out unwanted content such as violent or pornographic material, and also keeps a log of security threats and user activity. Naturally, the 700s passed the *Shields UP* security test with flying colors.

Setting up the 700s is slightly more involved than the other firewalls reviewed here, as you are required to first connect a PC to the 700s and then manually change the IP to initiate communications with the unit. After configuring the 700s by using its internal HTML installation wizard, you have to go back and readjust your IP address to its previous setting. After the 700s is up and running, the HTML management tools make it easy to add rules and services, which can be configured per IP address, service, or both. These settings let you play God with the network, allowing you to permit some users access to, say, your FTP server, and deny others access to anything other than HTML.

The 700s' activity logs are customizable, but there's no way to have a realtime view of network activity. In fact, you have to either manually check the logs by signing in to the 700s, or enable automatic alerts via e-mail so you're aware of attempts to hack into your network. The logs contain key data including a descriptive message of the logged activity, source and destination IP addresses, type of service, and applicable port.



It may not be much to look at, but **NetGear's RT311 offers advanced features for cheap and easy-as-pie installation.**

The WebRamp 700s' bang costs a lot of buck, but its cost depends on the number of licenses purchased. We feel it's worth it for the intelligently designed HTML interface that is both powerful and easy to navigate. Most importantly, the 700s does everything a decent firewall is supposed to do, and does it well.

NetGear RT311

Falling squarely in between the 700s and DI-701 in terms of features, NetGear's RT311 Gateway Router (**www.netgear.com**) is impressive for a $130 firewall. Unlike the plastic shell of the other firewalls, the RT-311 sports a steel-blue metal exterior with five LEDs, a serial port, and a WAN and LAN port (a four-LAN port version, the RT-314, is available at a street price of $170). The firewall technology employed by NetGear is similar to that used in the WebRamp 700s, employing both Stateful Packet Inspection and NAT to thwart hacker attempts and protect your network. And just like the DI-701, the RT311 will permit 32 users to access the Internet through a single broadband modem.

For our cable modem installation, all we did was plug in the connections, reboot our computer and modem, and, presto, the darn thing worked. Software wasn't necessary. If the firewall doesn't fire up right away, the RT311 offers an easy-to-use HTML wizard for basic connectivity configuration that you can access through a web browser. Most purchasers will use the RT311 in its default configuration, which involves simply turning it on. For additional options, such as establishing firewall rules or merely setting the administrator password, the RT311's limited HTML wizard is of little help. One must muddle through an arcane interface in order to customize firewall rules. The rules use either protocol-specific or generic packet filters, so you can block incoming or outgoing packets based on source or destination addresses, port numbers, or raw data patterns. Compared to the 700s' slick HTML control panel, modifying the RT311's advanced firewall settings is a real chore.

The RT311 did a fine job in preventing *Shields UP*'s unsolicited inbound packets from reaching our PCs, but left us wondering why NetGear didn't take the time to make a more complete HTML management interface to control all of the RT311's features. What also puzzled us was the lack of a readily viewable activity log. The RT311 is capable of sending detailed Syslogs to a Syslog server, but there's no way to view activity logs directly, as with the 700s. NetGear is currently working on an update to the RT311's firmware and HTML interface, and, hopefully, NetGear will add these features in future firmware revisions.

—Mark Miller

NETGEAR

PLUSES
- Plug-and-play installation
- Advanced packet inspection technology
- 32-user NAT and rules-based firewall for cheap

MINUSES
- No realtime monitoring
- Management interface needs work
- Doesn't alert you to pre-existing trojans

D-LINK DI-701 — 6
$100 | D-Link Systems, Inc.
Buy www.seemebuyme.com/mpc1131

WEBRAMP 700S — 9
$400 for five users (price varies per number of licenses) | Ramp Networks
Buy www.seemebuyme.com/mpc1132

NETGEAR RT311 — 7
$130 | NetGear
Buy www.seemebuyme.com/mpc1133

For definitions of Terminator words, check out the Terminator online at www.maximumpc.com.

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Thumpin' Thunderbirds

MOBOS PUT A HURT ON INTEL'S BEST

AMD's Thunderbird processor is the hot ticket these days. Naturally, a new processor requires a new motherboard—or at least that's the excuse you can use to rationalize an upgrade. Which KT133-based Athlon board is best? We rounded up the pick of the litter, and put 'em to the test.

ASUS A7V

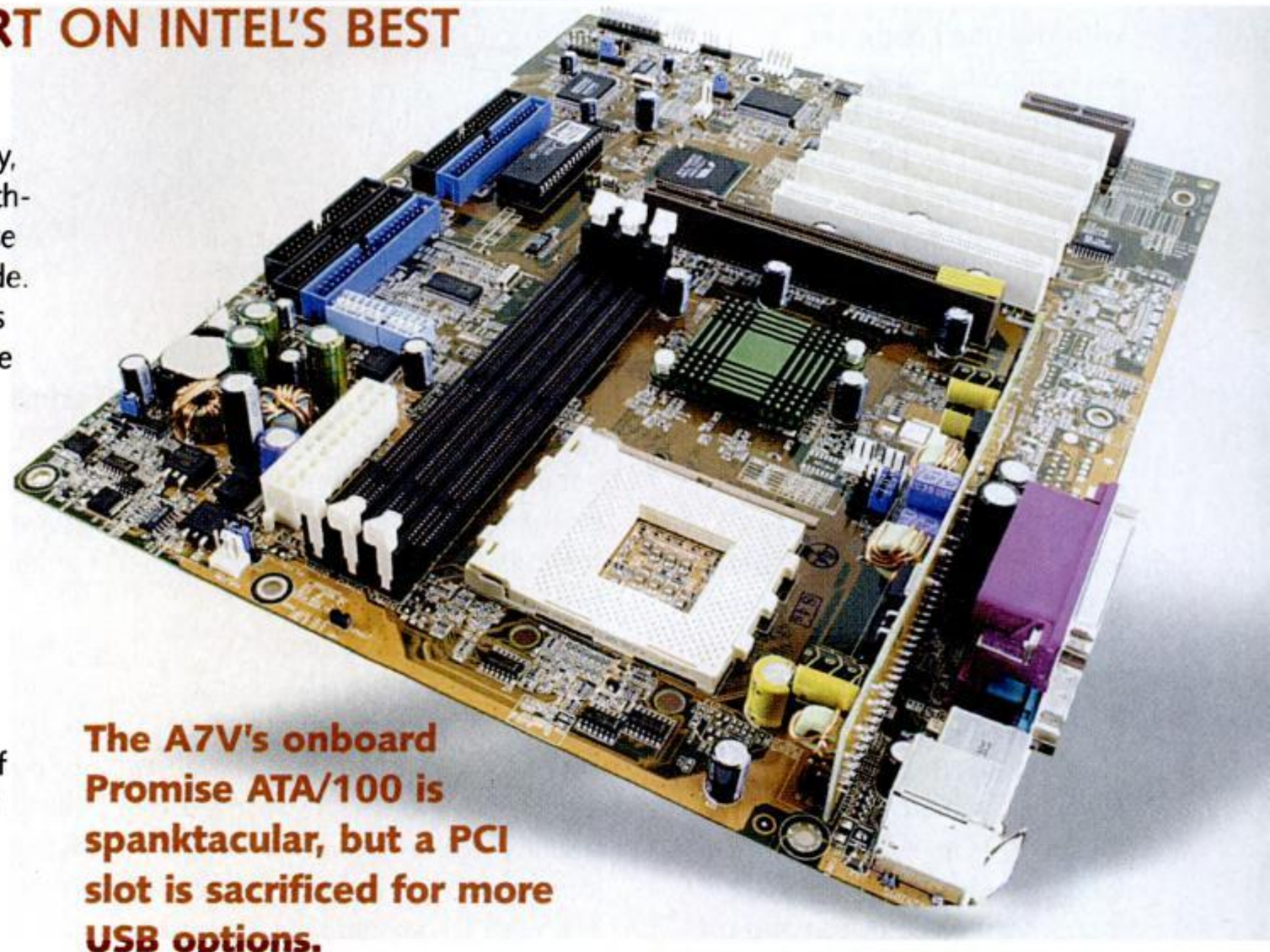
PLUSES
- Jumper and jumperless design
- Lots of USB options
- Fast

MINUSES
- Sacrifices one PCI slot
- CMOS jumper is nonexistent

TRINITY

PLUSES
- Jumperless
- Super-fast boot times
- Six PCI slots

MINUSES
- No ATA/100 support
- Big honking capacitors



The A7V's onboard Promise ATA/100 is spanktacular, but a PCI slot is sacrificed for more USB options.

Asus A7V

The A7V is Asus' newest Athlon board and has some super-swank features. Asus (**www.asus.com**) not only offers ATA/66 support, but ATA/100 support as well, care of a Promise controller super-glued to the PCB. There are no ISA slots, but that's fine, because you'll find no ISA love in the *Maximum PC* Lab. There are only five PCI slots, and there could have been a sixth if it weren't for the extra USB port above the AGP slot. At least Asus included an AGP Pro slot to assist the workstation folks in the back row.

The biggest difference between this board and the others in this roundup is the inclusion of a vertically mounted VRM (Voltage Regulation Module). This serves as an alternative to large capacitors, which typically reside next to the CPU and create a perilous situation when a heatsink is placed on the processor. If you accidentally bump a capacitor too hard with a heatsink, your board may be fubar.

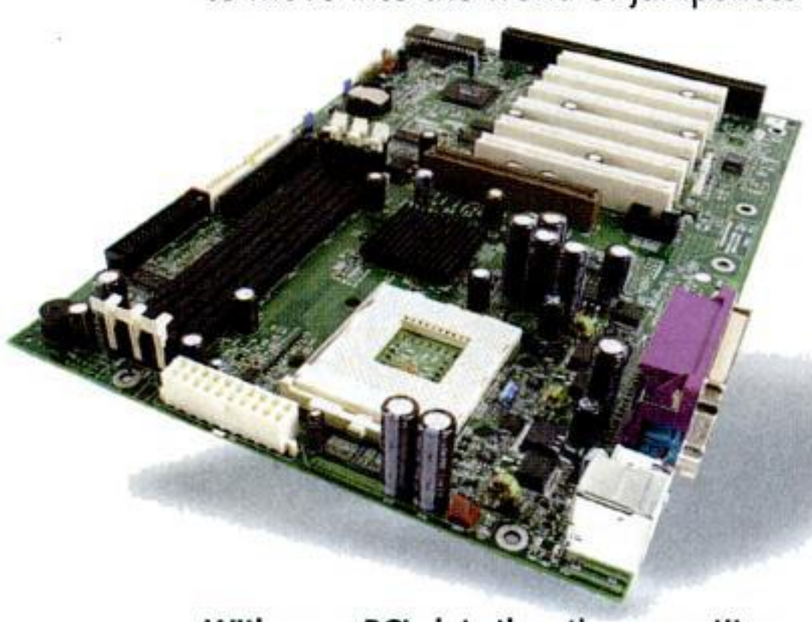
To appease old fogeys who refuse to move into the world of jumperless nirvana, this board offers a whole armada of jumpers. However, Asus didn't want to leave jumperless fanatics out in the cold, so they threw in software support as well. Simply set a few jumpers, and, lo and behold, you can muck about with key system settings in a BIOS menu.

The A7V boasts overclocking options aplenty. Bus speeds can be adjusted across 24 increments to hit a max of 145MHz. The board does present a challenge when you want to clear the CMOS—you have to physically short two solder points near the battery. A regular jumper would be preferable to this arcane design.

Features aside, the most important aspect of a mobo is its stability and performance, and the Asus board masters both. In our *Quake III* testing, the A7V beat out the other mobos by a full 3fps. But where the board really shined was in the Sisoft *Sandra* tests. In the streaming FPU and integer tests, the A7V forced out 564MB/sec and 448MB/sec—that's 144MB/sec and 70MB/sec more than the nearest T-bird competitor. Smokin'! In other tests, the A7V fared competitively as well.

Unfortunately, this board has a dark side called "onboard sound." The craptacular Cirrus Logic chipset is nailed to the PCB. Luckily, adding a soundcard resolves this issue.

All in all, the A7V packs a wallop into a stable package. Not once did this board bite the hand that fed it, and that says a lot about the present state of Athlon motherboards in general. Grab this one while you can.



With more PCI slots than the competitors, this board could be your ticket—just don't ask for overclocking.

Tyan Trinity KT (S2390)

When AMD released its Thunderbird proc, Tyan (**www.tyan.com**) updated its Trinity series of Athlon boards, introducing the S2390. Not surprisingly, the S2390 is very similar to the Tyan S2380, which is based on the KX133 chipset. It packs the same six PCI slots, but adds an ISA slot and support for more memory (up to 1.5GB). Unlike the Asus board reviewed here, the Tyan comes with a vanilla AGP slot.

The S2390 comes with the same ultra-large capacitors that plague the MSI board reviewed next. Watch out, because these looming electronic grain silos could get in the way of particularly large heatsinks. Shoot, heatsinks are hard enough to accommodate *without* capacitors in the way. Just make sure you're careful, because no one will give you a refund if you bust a capacitor during heatsink installation.

The S2390 is built for stability, and with only two FSB speeds above 100MHz (120MHz is the limit), you aren't going to overclock this

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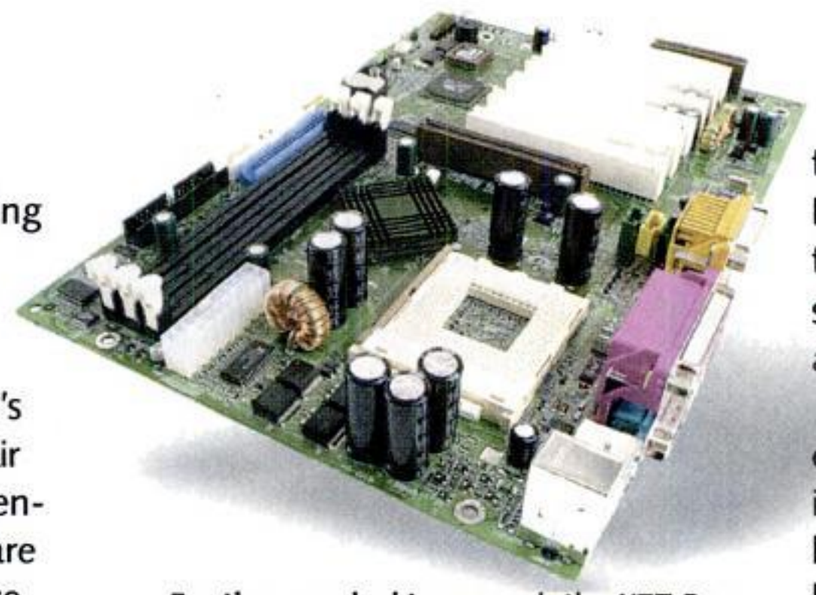
board very far.

The S2390's most compelling feature is speed during bootup. Can you say, "Shut down and boot back up in less than 30 seconds"? Yes, it's that fast. In fact, when you pair this board with WinME's propensity to support certain hardware for faster boot times, you have yourself a darn good reason to invest in Tyan PCB.

The board's actual performance was uninspiring compared to the mighty Asus board. And although it beat out the MSI board in virtually every category, it did so by small percentages. The Tyan board did manage to beat the pack in *Photoshop* and *SYSmark2000*, but it still doesn't stand out prominently from the rest—not in the way the Asus board does in terms of speed, or the MSI board for overclocking.

Although more and more mobos are implementing onboard sound support; Tyan didn't buckle under the pressure to do so. Don't get us wrong, onboard sound has its advantages—if you're cheap or deaf, for example—but we prefer a good 3D soundcard for our audio enjoyment.

If you're into rock-solid stability, don't want overclocking, and really enjoy fast boot times, Tyan's S2390 won't fail you. But if you want ATA/100 support and overclocking friendliness, shop elsewhere.



For the overclocking crowd, the **K7T Pro is a real head-turner.**

ATA/66 or opt for external ATA/100 action. Rounding out the I/O package are two USB ports in the traditional location, as well as another USB port at the bottom of the board. This extra port allows for front-of-the-case USB action, but MSI didn't bundle an extra cable for this function.

While benchmarks show this board to be slower than the Asus board, benchmarks don't tell the entire story. The K7T Pro tied the Tyan board in our *Quake III* benchmark and lost by just a single point in *SYSmark2000* to Tyan's best. In virtually every other category, the K7T Pro was neck and neck with the S2390.

For overclockers, MSI bundles its *Fuzzy Logic II* program, which sets frontside bus speeds one bin at a time from within Windows. Please note, you won't get any more than the 13 bus speeds—up to120MHz—that are already offered through the BIOS. The best overclocking feature that this board offers are seven speed increments between 100MHz and 110MHz.

Be aware of the large capacitors on this board. The dangers of breaking one are slim, but so is the possibility of winning the lottery. It can happen to you.

The board was solid in our stability tests, and with the add-on ATA/100 controller, you can rest assured you'll have hard drive upgrade options in the future. This board is the easiest board of the bunch to overclock. For those new to overclocking, this is the board you'll want, even though it lagged behind the Asus board during benchmark runs.

—Scott Tarr

MSI K7T PRO — 9
$120 | Micro-Star International
Buy www.seemebuyme.com/mpc1135

PLUSES
- Overclocking software for the newbie
- Jumperless

MINUSES
- Big honking capacitors
- ATA/100 support takes away PCI slot

ASUS A7V — 9
$135 | ASUS
Buy www.seemebuyme.com/mpc1134

TYAN TRINITY KT — 8
$125 | Tyan Computer
Buy www.seemebuyme.com/mpc1136

DARE TO COMPARE

MANUFACTURER	MSI K7T PRO	ASUS A7V	TYAN TRINITY KT
Chipset	VIA KT133	VIA KT133	VIA KT133
Supported processors	AMD Thunderbird/Duron 550MHz to 1GHz	AMD Thunderbird/Duron 550MHz to 1GHz	AMD Thunderbird/Duron 550MHz to 1GHz
Expansion slots	1 AG/ 6 PCI/ 1 CNR	1 AGP/ 6 PCI/ 1 AMR	1 AGP/ 6 PCI/ 1 ISA (shared)
Memory support	3 DIMMS for 1.5GB of PC133 or VC133 SDRAM	3 DIMMS for 1.5GB of PC133 SDRAM	3 DIMMS for 1.5GB of PC133 or VC133 SDRAM
Ports	2 serial/ 4 USB/ 1 parallel/ 2 PS/2/ 1 gameport	2 serial/ 7 USB/ 1 parallel/ 2 PS/2	2 serial/ 4 USB/ 1 parallel/ 2 PS/2
Formfactor	ATX	ATX	ATX
Overclocking rating	Excellent	Good	Poor

BENCHMARKS	MSI K7T PRO	ASUS A7V	TYAN TRINITY KT
Quake III Timedemo 1	57.7	**60.4**	57.7
SYSmark 2000	190	187	**191**
Sisoft *Sandra* MIPS	2791	**2816**	2813
Sisoft *Sandra* MFLOPS	1378	**1407**	1406
Sisoft *Sandra* Streaming Integer	372MB/sec	**448MB/sec**	378MB/sec
Sisoft *Sandra* Streaming FPU	406MB/sec	**564MB/sec**	420MB/sec
3DMark 3D Marks	4898	4897	**4909**
Photoshop 5.5	2:13 (132)	2:05 (125)	**2:04 (124)**

Notes: Best scores are bolded. Settings for *Quake III Arena*: 1.17n 1024x768, 32-bit color, trilinear filtering, maximum textures, 32-bit textures, demo 1. Settings for *3DMark* test: 1024x768, 16-bit color, double buffered, T&L duties handled by CPU. Test bed: Windows 98 SE, Quantum Fireball KA ATA/66, 800MHz "EB" Pentium III, Elsa Erazor X2 DDR GeForce, Crucial Technology PC133 CAS2 SDRAM. Compatibility Equipment: 3Com 3C905B 10/100 NIC, Diamond Dual V.90 Shotgun ISA modem, Diamond 12MB Voodoo2, Sound Blaster Live! X-Gamer, Adaptec 2940U2W, Logitech USB Mouse, Logitech/Storm USB Scanner.

MSI K7T Pro
Micro-Star (**www.msicomputer.com**) fits a lot of features into its K7T mobo. It's the smallest board in this roundup and has six PCI slots, a standard AGP slot, no ISA, and an AMR slot. Upgrade options are plentiful to say the least. MSI even implemented onboard audio for cost-conscious folks who don't care about sound quality, and threw in a Promise ATA/100 PCI controller card, so you can use the onboard

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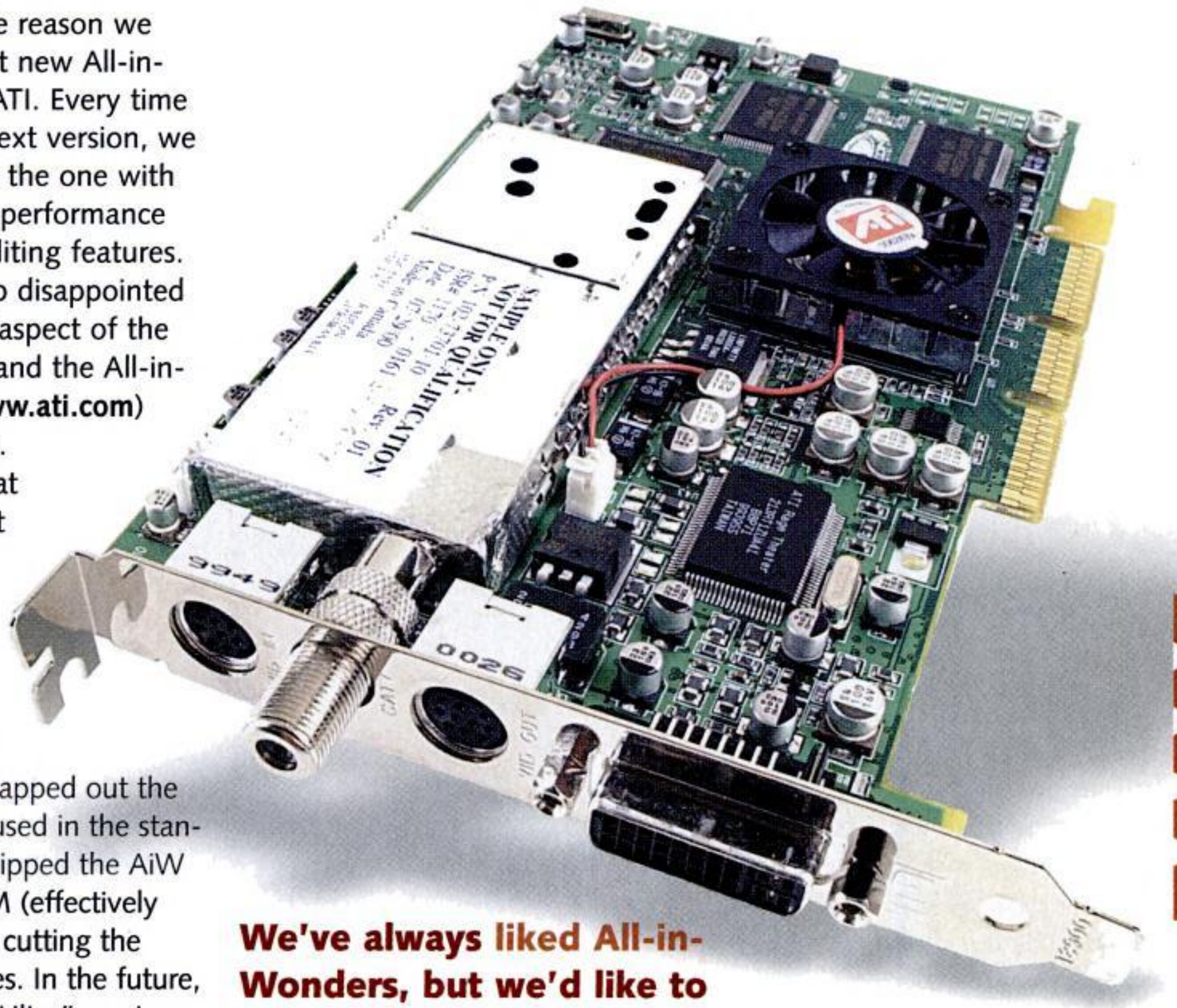
ATI All-in-Wonder Radeon

A SWISS ARMY KNIFE WITH A DULL BLADE

For some inexplicable reason we still get excited about new All-in-Wonder cards from ATI. Every time ATI announces the next version, we think it's going to be the one with uncompromising 3D performance and swanky video editing features. Inevitably, we end up disappointed with one or another aspect of the AiW's performance, and the All-in-Wonder Radeon (**www.ati.com**) is sadly no exception.

We understand that the AiW is targeted at people who don't care about maximum 3D performance, but we do. To save a few bucks on high-speed DDR SDRAM, ATI swapped out the 183MHz DDR RAM used in the standard Radeon and equipped the AiW with 166MHz SDRAM (effectively running at 333MHz), cutting the Radeon off at its knees. In the future, we'd love to see an "Ultra" version of the AiW clocked at the same speed as the standard Radeon. Don't power users deserve that much?

If you don't need mad-crazy 3D, and want integrated video editing and DVD playback, you can't go wrong with the AiW. With better TV-out support than any card we've seen and DVD playback that comes close to that of the best hardware MPEG-2 decoders, the All-in-Wonder is an awesome addition to any multimedia PC. Video greatness aside, what really makes the AiW stand out are its Personal Video Recorder (PVR) features.



We've always liked All-in-Wonders, but we'd like to see a little more oomph in the 3D department.

You're probably familiar with TiVO and ReplayTV, the first generation of PVR set-top devices which have been available for about a year. Well, ATI includes software with the All-in-Wonder that enables you to use your computer as a PVR. With PVR technology you can rewind, pause, and slo-mo TV as you watch, in addition to performing the standard functions of a VCR.

While the software included with the AiW isn't as polished as TiVO or ReplayTV's interface, it provides the same essential functionality. How much drive space does all this take? At a good-quality setting, a little more than an hour of video will fit on a 1GB platter. While that may sound like a lot of space, if you take into account the plunging prices of über-drives, the ability to store 100-plus hours of video on a single $200 drive is quite tempting.

As if that weren't enough, the All-in-Wonder ships with Ulead's *VideoStudio 4.0*, which allows users to edit and write MPEG-2 video streams they've captured. Unfortunately, the AiW just allows analog capture and doesn't include a FireWire port for digital video grabs.

This iteration of the All-in-Wonder is the best we've seen yet, but still it ain't all that. Its 3D performance is perfectly acceptable for today's titles and faster than most cards on the market, but by slowing down the card's memory and clock speed in order to shave $40 off the price, ATI made a compromise we can't support. Of course, we liked the AiW's multimedia features enough to make it the centerpiece of our Home Entertainment PC (see page 32 for more juice). Unfortunately the All-in-Wonder Radeon is just about 23MHz away from the world of Kick Ass.

—Will Smith

PLUSES
- Great DVD playback
- Good video capture
- PVR features
- Adequate 3D performance

MINUSES
- Merely adequate 3D
- No FireWire input
- Won't output DTS from DVD

THE SPECS

MEMORY	32MB DDR SDRAM
CORE CLOCK	166MHz
MEMORY CLOCK	166MHz
RAMDAC	350MHz

BENCHMARKS

ATI ALL-IN-WONDER	
Quake III 1024x768 demo001	48.1
Quake III 800x600 Quaver	56.1
MDK2	77.9
3DMark Game 1 Medium Quality 16-bit	63.5
3DMark Game 1 Medium Quality 32-bit	61.1
Expendable	70.8
Sysmark 2000	574

Benchmarked on our Dell 733MHz Pentium III test system using version 7.0 of the ATI drivers. V-Sync is disabled in every benchmark.

MAXIMUM PC VERDICT 8

$300 | ATI

Buy www.seemebuyme.com/mpc1105

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ATX Case Studies

IT'S WHAT'S ON THE OUTSIDE THAT COUNTS

Building your own PC? Chances are your new mobo will be ATX. Intending to install that mobo in a case of some sort? You're in luck! It just so happens that right here we offer three ATX case reviews. Yes, indeed, you picked the right day to wander into Uncle Gordo's Case Emporium...

Forget that milk-sop translucent crap. If you want sexy, Cooler Master's aluminum case has it in spades.

Cooler Master ATC-200

This is simply the most beautiful case we've ever seen. Made entirely of aluminum, the Cooler Master ATC-200 (**www.coolermaster.com**) is built with the fit and finish of an aircraft.

The ATC-200 isn't all about good looks, however; as a frigid enclosure, the case lives up to its maker's name. It's been rigged with an impressive array of 80mm fans, including one that moves air past the CPU, another that vents directly out of the top of the case, and two that suck air through the front bezel.

The two front fans are fitted into areas normally reserved for add-in drives, so any such devices end up protruding from the back of their enclosures, much like a mattress hanging from the back of a pickup bed. The case is designed for ATX boards exclusively, with a mobo tray that slides out for easy maintenance. Though it's described as a "value server," we don't advise trying to jam a lot of equipment into the ATC-200, as it would be a tight squeeze. In fact, we think Cooler Master is going a little overboard by calling this a server case of any kind.

Despite the awkward drive bay situation, all other aspects of the ATC-200 demonstrate amazing attention to detail. The five fans are sheltered by wire screens to protect cables or fingers from the blades of a moving fan—granted, this isn't a serious safety hazard, but the finishing touch is commendable. Refinement is also manifest in the front bezel, which is made of brushed aluminum and fastened to the case with hex bolts. Even the power and reset switches are made of burnished aluminum—no faux chrome or plastic here.

Cooler Master doesn't include a power supply, but the case is designed to accommodate stock ATX power supply dimensions. Inserting our 300-watt Delta power supply was a bit clumsy given the brackets and fan that stood in the way.

It's not advisable to use the ATC-200 as a foot stool after a long day of work. The aluminum case is sexy, but certainly more delicate than your typical pot-metal PC case. An accidental kick to the side panel or front bezel could leave you in tears. Then again, why would you use the ATC-200 for an ottoman? A case as beautiful as this should rightly sit on top of your desk for all to see.

At $300, the ATC-200 carries a steep price tag for a mid-tower case sans power supply, but it's worth every penny. The ATC-200 screams prestige and pride. If you're going to drop thousands of ducats on a system, why stuff it into a generic, cream-colored, $79 box?

COOLER

PLUSES
It's beautiful, baby!
Well-blown

MINUSES
No power supply

ANTEC

PLUSES
Nice amenities
Solid construction

MINUSES
Looks might turn off some
Front bezel fan ports not filtered

Antec's SX1030 bridges the mid- and full-tower classes.

Antec SX1030

Although it doesn't have the sheer sex appeal of the ATC-200, Antec's SX1030 (**www.antec-inc.com**) is nonetheless a workhorse with impressive features.

Two 80mm fans are mounted in purple plastic brackets directly behind the CPU, and two empty

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fan brackets are mounted behind the front bezel. As with the ATC-200, filling these brackets will consume space typically reserved for add-in drives. But unlike the ATC-200, the SX1030's front bays are unfiltered and therefore vulnerable to dust and other airborne debris.

The screwless case features two 3.5-inch drive bays that you can pop out with the flip of a lever. The case's four 5.25-inch bays use a plastic rail system for drive mounting. And here's a nice touch: You tuck away your unused plastic rails in a bracket at the bottom of the case so you won't lose them. Another nice touch is a locking, latched door that grants access to the case's internals. A locking, hinged door (which can be completely removed) covers the external drives. We aren't generally fond of swinging bay doors, since they can be ungainly, but for security they can't be beat.

The SX1030 lacks a removable motherboard tray, but the case grants enough maneuvering room inside to install a motherboard. Plus, the drive bays snap out, allowing easy installation of even an extended ATX board.

Overall construction of the SX1030 is top-notch, and most of the sharp edges have been deburred. The case is very sturdy, even with both sides removed. Some say case strength doesn't matter, but we once actually shorted out a system when it flexed just enough for the floppy drive to ground out against its brackets.

The SX1030 is topped off nicely with an Antec 300-watt power supply, which has an excellent reputation. This supply features Smart Power for increased fan speed as case temperatures rise.

Provided you dig the looks, the SX1030 fits the bill for folks who need something larger than a mid-tower, but don't want to deal with the bulk of a full- or super-tower case.

Inwin's Q500 is the Ford Taurus of the case world.

Inwin Q500

If the Cooler Master ATC-200 is a Mercedes, and the Antec SX1030 is a Cadillac, then Inwin's classic Q500 (**www.in-win.com**) is easily the Ford Taurus of cases. The Q500 won't thrill you with dazzling options, but it's designed to handle heavy-duty loads.

With five external 5.25-inch bays and a single external 3.5-inch bay, the Q500 is clearly in the full-tower class of cases. Internally, the Q500 features a single cage with room for up to five 3.5-inch hard drives. While you may fantasize about putting five hard drives into the cage, we must advise you to curb that impulse. Inwin might have given you room for that many hard drives, but it made no provisions for cooling the whole load. By filling the cage to the brim, you'll cut off what little air flow exists and risk overheating the drives. If you do decide to load up on hard drives, you should stagger them (so air can flow between them) or add auxiliary cooling to the drives.

The Q500 doesn't come equipped with any fans. However, there are mounts for three 80mm fans—one above the power supply, one behind the CPU, and one behind the front bezel. Inwin also perforated the sides of the case along the length of the front to aid airflow. There's a generous amount of room in the case for elbow-deep repairs, as well as a removable motherboard tray. Removable trays are a plus, but the one in our review unit required much effort to get it flush in the case.

Like the SX1030, the Q500 has plastic feet that swivel out to help stabilize the case. Overall construction is top-notch, and most of the surfaces have been folded over to eliminate sharp edges. The case is also very sturdy and doesn't flex with the sides off.

The Q500 is well-recognized as a workhorse PC case and can be found on the street for about $100, including a 300-watt power supply. With its square, no-nonsense looks and spacious interior, the Q500 is a great beginner's case that almost anyone can grow old with.

—Gordon Mah Ung

INWIN

PLUSES
Clean lines
Solid construction

MINUSES
Front bezel fan ports not filtered
Mounting holes for 5.25-inch drives are annoying

COOLER MASTER ATC-200 9
$300 w/o power supply
Cooler Master
Buy www.seemebuyme.com/mpc1104

ANTEC SX1030 8
$130 w/300-watt power supply
Antec
Buy www.seemebuyme.com/mpc1137

INWIN Q500 8
$100 w/300-watt power supply
Inwin
Buy www.seemebuyme.com/mpc1138

DARE TO COMPARE

COMPANY	COOLER MASTER	ANTEC	INWIN
Model	ATC-200	SX1030	Q500
Drive bays	Three 5.25-inch external, two 3.5-inch external, five 3.5-inch internal	Four 5.25-inch external, two 3.5-inch external, four 3.5-inch internal	Five 5.25-inch external, one 3.5-inch external, five 3.5-inch internal
Power supply	none	300 watts	300 watts
Cooling	Five 80mm mounting points/ five 80mm fans included	Four 80mm mounting points/ two 80mm fans included	Three 80mm mounting points/ no fans included

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Qbe Cirrus

LOOKS AREN'T EVERYTHING

Since it arrived in the Lab, the Qbe (pronounced "cube") Cirrus has received a lot of attention **(www.qbenet.com)**. Its curvy, blue-and-silver shell and gorgeous screen have prompted more than one editor to remark on the Cirrus' appearance. So, why did we give it such a low verdict? Because that comment was always followed with this one:

"What the heck would you use it for?"

An odd cross between a notebook computer and drawing tablet, the Cirrus is intended to create a new category of portable devices. It's about the size of a thick stack of legal-sized paper and weighs just over eight pounds. Behind its 13-inch Active Matrix TFT screen beats a 400MHz Pentium II, a 12GB hard drive, and 128MB of PC100 SDRAM—not exactly a top-of-the-line setup, but, hey, we've seen worse. In fact, that pretty much sums up sentiment about the Cirrus in general: It's not so bad, but it's not so good, either.

PLUSES
- Gorgeous screen
- Unique case shape
- Comes with every I/O peripheral

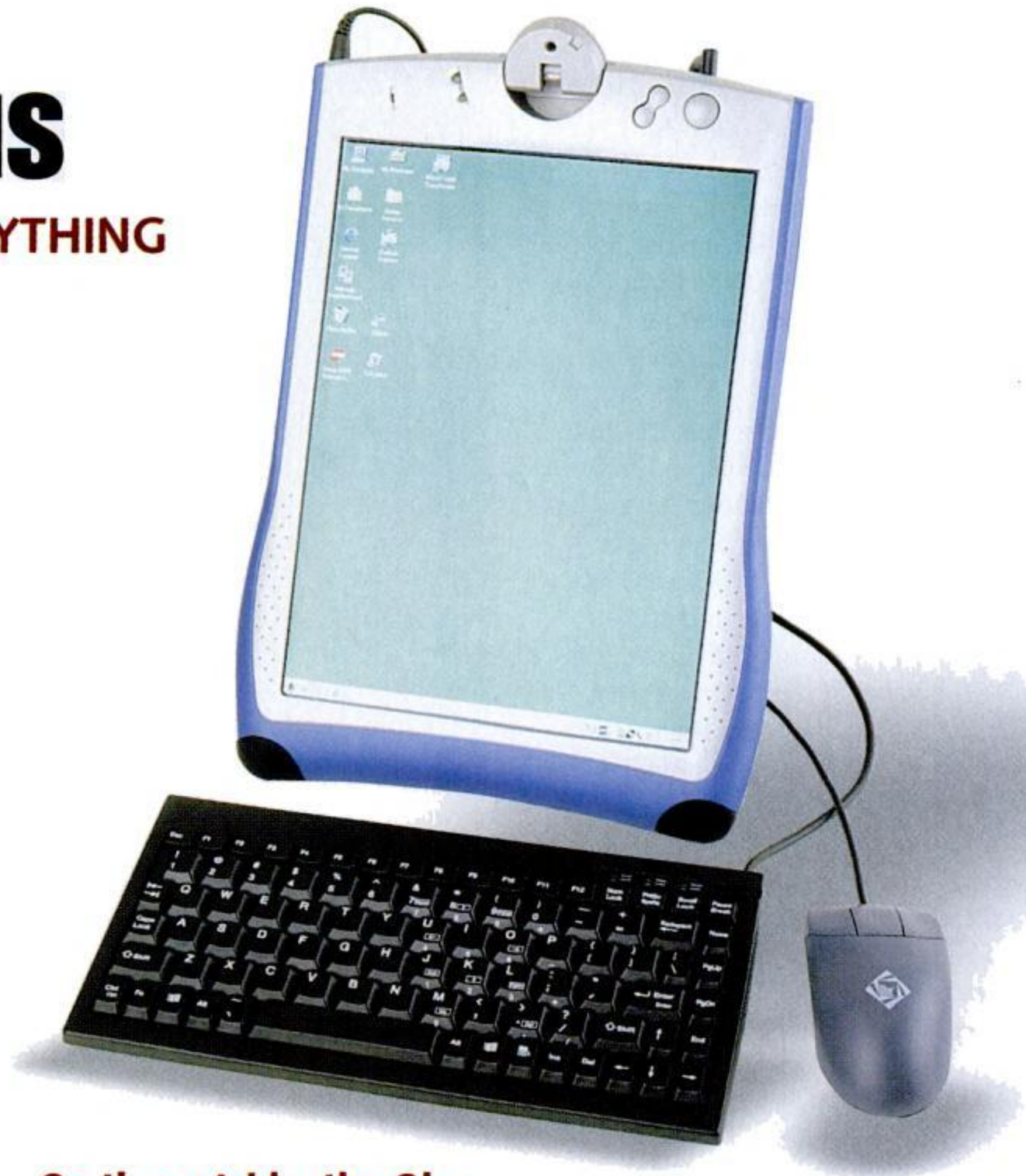
MINUSES
- Pitiful performance
- No DVD
- Too heavy

The Cirrus comes equipped with so much hoo-ha, the thing looks like a tarantula when all of its accouterments are attached. A diminutive 88-key keyboard, USB mouse, stylus, and noise-canceling headset with microphone are all part of the standard package. There's also the Porticle easel stand, which supports the unit in a vertical position and equips it with additional USB, PS/2, parallel, and serial ports, as well as a docking port. The Cirrus also includes a modem-Ethernet PCI card, a CD-ROM, and a 270K-pixel, color-CCD camera that's built right into the top of the case. The camera is hardly a top-notch digital device, but it'll do the trick if you're looking to take some snapshots.

THE SPECS

CPU	Pentium II 400MHz
RAM	128MB SDRAM
HARD DRIVE	12GB
I/O PORTS	Two USB | Two PS/2 SB | One parallel SB | One serial SB | TV-out | IEEE-1394 | IrDA | Docking port | Ethernet | Modem
ETHERNET-MODEM	PCMCIA card, two Type-II, one Type-III
DISPLAY	13.3-inch viewable, Active Matrix Color TFT
SOUND	ESS Maestro 1980-M3 Audio Accelerator

In addition to Windows 98, a smattering of "multimedia" software is included. Most of the titles are tied to a specific peripheral, such as the virtual onscreen keyboard called *My-T-Touch* that lets you punch out keys with your fingers or the stylus. There's also speech recognition software for the microphone, a handwriting recognition package for the stylus, and *Q-Shot Camera* for watching video footage taken with the built-in camera. All in all, it's a satisfying bundle, but not on the top of our list for day-to-day duties.



On the outside, the Qbe Cirrus is good-lookin'—but under that screen, there's not much cookin'.

For fun (we don't get out much), we ran a few benchmarks on the bugger, and surprise, surprise—its performance was abysmal! Its score in *SYSMark*, the best benchmark test of real-world usage, was a pathetic 67—that's nearly off the negative end of our benchmark charts. Things panned out about the same in the *Photoshop* and *HD Tach* benchmarks, where the Cirrus earned a 325-second score and a 10.32MB/sec score, respectively. A speed demon, it is not.

But the Cirrus does have one very redeeming quality: its screen. We spent hours oohing and ahhing over the 13 viewable inches of active-matrix TFT color that can be easily set to display in portrait or landscape settings. The screen is also protected by a plastic casing that helps it weather abuse by the stylus or the rigors of modern life. The screen is so nice, in fact, that we yearned to watch a DVD movie on it, but the lack of a DVD player crushed this dream. The Cirrus is equipped with a FireWire port, but trying to crunch digital video on such a slow machine is an exercise in tedium.

At the end of the day, we just don't know who would use the Cirrus, or where they'd use it. It's too heavy and under-equipped to replace a PDA or a notebook, and it's too pricey to justify its limited utility. It's a neat-looking gizmo, but little more.

—Kristen Shepos-Salvatore

MAXIMUM PC VERDICT 5

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Palm m100

BACK TO BASICS

Why buy Palm's new m100 (**www.palm.com**) instead of the Palm IIIe? Both are powered by the 16MHz Motorola Dragonball EZ processor—though "powered" may be something of an overstatement, since they run noticeably slower than their better-equipped Palm brethren. Both come equipped with the latest version of the Palm OS (3.5), but without Flash ROM, so OS upgrades are out. Both offer a scant 2MB of RAM memory, and both boast a skimpy $150 price tag. So, other than the IIIe's slightly larger screen—a 4-inch square versus the m100's 2-inch square—why choose one over the other? Because the IIIe is going the way of the dodo. Henceforth, the m100 will take up the mantle as Palm's "introductory" PDA—low-maintenance, low-priced, and low-featured.

The m100 is constructed of a much lighter-weight plastic than any other Palm we've seen. We thought the m100 felt almost cheap. Then we remembered—it is! Its flared bottom prevents you from using it with existing Palm peripherals, though Palm is creating a line of peripherals specifically for the m100. Fashion mavens in particular will enjoy the option of snapping off the m100's faceplate and replacing it with others of different colors (sold separately for $20 a pop). An m100-compatible cradle is also sold separately; the m100 comes standard with a synching cord that has a serial connection (a USB adapter is available).

The Palm m100 can handle basic PDA needs, but not much more.

There's no beating the m100's low, low, low price. But you're getting what you pay for in terms of memory and features—this is not a PDA that's built to grow along with your tech-headedness. On the other hand, if you just need a reliable way to store phone numbers and keep a schedule, the m100 gets the job done.

—Kristen Shepos-Salvatore

PLUSES
- More than adequate for basic PDA needs
- Price is right
- Kinda cute, in a Fisher-Price sort of way

MINUSES
- No expandability
- Incompatible with current peripherals
- So little memory!

THE SPECS

PROCESSOR
16MHz Motorola Dragonball EZ

SCREEN DIMENSIONS
2 x 2 inches

RAM
2MB

DIMENSIONS
4.66 x 3.12 x 0.72 inches; 4.4 oz

BUNDLE
Synching cord | Palm *Desktop* software | Chapura *PocketMirror* | *AvantGo*

MAXIMUM PC VERDICT 7

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Mice with Missing Parts

MICROSOFT AND LOGITECH SWITCH PLACES

Microsoft was the first to market an optical, non-trackball mouse, and Logitech was the first to come out with a cordless mouse. Now these companies have switched sides, with Microsoft offering a cordless mouse and Logitech going optical. Since the shoes are officially on the other feet, we decided to put both mice through the paces.

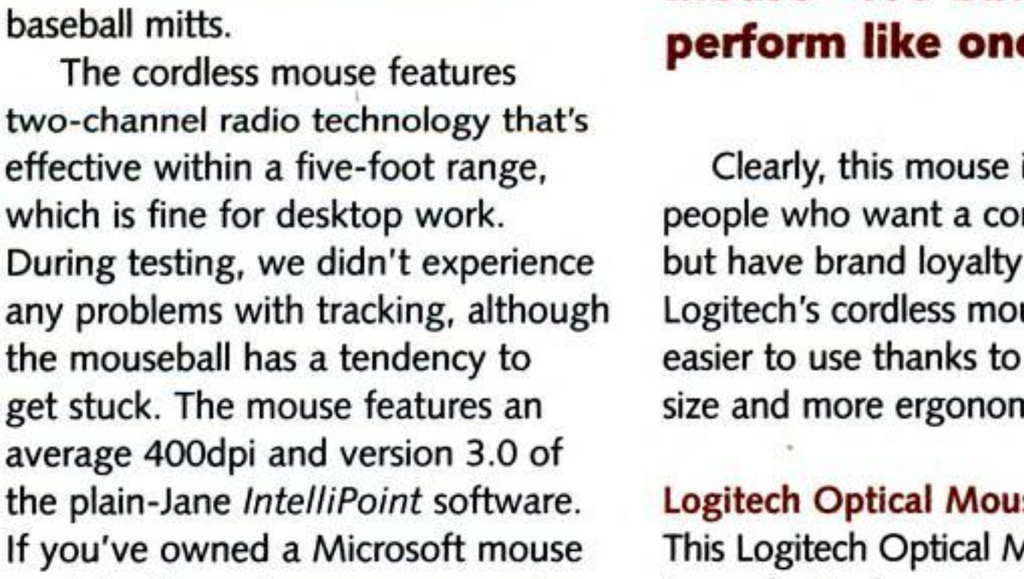
MICROSOFT
PLUSES
Uh...it's cordless?
MINUSES
Too big
Status quo software

LOGITECH
PLUSES
Killer looks
Interesting software
MINUSES
Optical camera flaky for gaming
Only for right-handed users

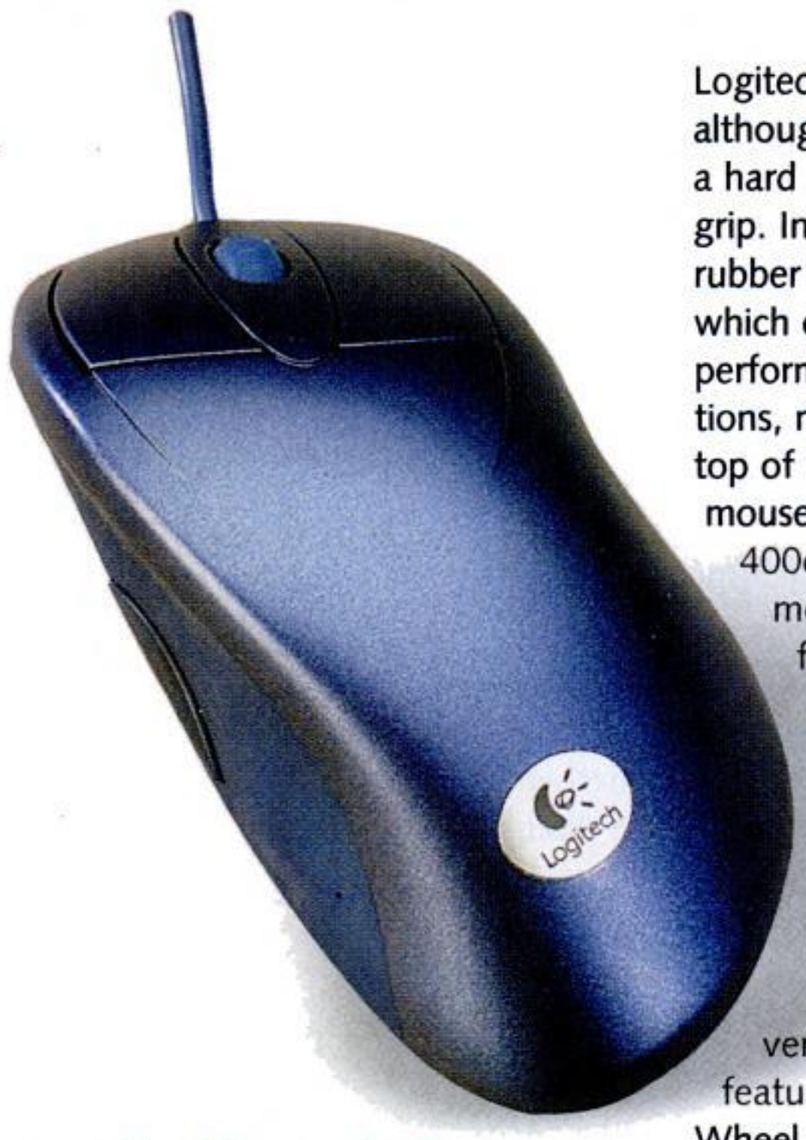
Microsoft Cordless Mouse

We have no love for Microsoft's optical mouse, and we have even less appreciation for this cordless monstrosity (**www.microsoft.com/hardware**). Its radio tracking ability works just fine, but it's so friggin' big, it's a joke. It feels twice as large as the standard IntelliMouse and is very hard to wrap your hand around. Because Microsoft made its optical mouse huge as well, we are forced to conclude that the R&D testers for the company are Amazonian freaks of nature with hands the size of baseball mitts.

The cordless mouse features two-channel radio technology that's effective within a five-foot range, which is fine for desktop work. During testing, we didn't experience any problems with tracking, although the mouseball has a tendency to get stuck. The mouse features an average 400dpi and version 3.0 of the plain-Jane *IntelliPoint* software. If you've owned a Microsoft mouse made in the past year or so, you're familiar with this software—the cordless mouse brings nothing new to the table.



We found Microsoft's Cordless Mouse to be too large for extended comfort, just like its Optical brother.



Logitech's Optical Mouse looks like a kick ass mouse—too bad it doesn't perform like one.

Clearly, this mouse is targeted at people who want a cordless option but have brand loyalty to Microsoft. Logitech's cordless mouse is much easier to use thanks to its smaller size and more ergonomic shape.

Logitech Optical Mouse

This Logitech Optical Mouse (**www.logitech.com**) certainly looks like a million bucks, but its performance is not quite as impressive. It offers the exact same Agilent optical technology used in Microsoft's optical mouse—a CMOS digital camera which snaps 1,500 pictures of the mousing surface every second to track changes in movement. Not surprisingly, the optical technology is sufficient for desktop work, but flaky in gaming. The mouse is shaped similarly to Logitech's MouseMan Wheel, although the Optical's inner side has a hard rubber surface for a better grip. In the middle of the grippy rubber is a small thumb button, which can be programmed to perform any of a number of functions, much like the buttons on the top of a mouse. The Logitech optical mouse boasts the same middling 400dpi as the Microsoft cordless mouse and works best on surfaces that are monochromatic since multi-colored surfaces confuse the mouse's digital camera. Unfortunately for southpaws, this mouse is made exclusively for right-handed people.

Logitech includes the latest version of *Mouseware*, which features a new utility called Web Wheel. The Web Wheel, basically a pie chart display of various web navigation functions, appears on your screen when the mouse's wheel button is depressed, making it possible to perform standard browsing actions with your mouse. It's a clever feature, but we're so accustomed to using the built-in navigation keys in our web browser that, frankly, we forgot about the Web Wheel.

Obviously, we weren't blown away by either of these mice. We will hand it to Logitech, however, for beating out Microsoft on both the optical and cordless fronts. Plain and simple, Logitech offers superior model designs and mildly better software packages. Regardless, we'll continue using our old-school ball mice until something more compelling comes along.

—Josh Norem

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LOGITECH MOUSE **7**
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Evolva

MUTANTS NEED LOVE, TOO

There are no evolutionary dead ends in the future—at least not in *Evolva*'s future. In this offbeat action/adventure game (**www.interplay.com**), you control a group of infinitely adaptable soldiers known as Genohunters. By absorbing the DNA of the creatures they kill, Genohunters acquire the characteristics of their disposed opponents. Genohunters are on the front lines of humanity's fight against a planet-destroying parasite that has spread across the galaxy. If nothing else, *Evolva* gets credit for being different.

In most action games, you control one character who is capable of picking up weapons. *Evolva* takes a more complex approach, putting you in command of a ship that's controlling four different Genohunters. You control a single hunter at a time, swapping among them via hotkeys, and the others follow via AI, fighting and feeding when necessary. The third-person view focuses on the Genohunter currently under control, while smaller screens display his three squad mates. The action is standard third-person fare: Running and jumping through environments, fighting enemies, and trying to get your camera out from behind a rock are all par for the course.

What sets *Evolva* apart are its trappings. In each mission, the Genohunters encounter new creatures. Many are mutants themselves, and all are interesting. When you kill a creature and absorb its "meat"—and thus its DNA—you gain that creature's unique ability to, for example, jump high, or run fast, or use fire as a weapon. A mutation menu allows you to bestow these genetic features upon the other Genohunters under your control, though there's often a price to pay—adding claws may decrease speed, and improved jumping skills may impair your ability to attack. As your Genohunters mutate, their appearances are altered—they sprout crests and claws, grow sleeker or heavier, or change color.

In *Evolva*, you acquire the DNA attributes of slain opponents.

Evolva's worlds are packed with enemies, and the scant availability of resources required for healing makes each level relatively difficult to complete. The landscapes are stylishly outfitted with brightly colored organic designs, but a lack of distinguishing features within the levels makes finding your way around difficult and boring. Most levels have a puzzle-like quality, with a list of objectives along with frustrating mazes. Poly counts are unusually high, resulting in highly detailed models and lifelike animations. *Evolva* also offers a welcome new twist on multiplayer, with its eight-person deathmatch mode involving heavy mutation among participants.

The problem with *Evolva* lies in level and mission design. Levels look weird and wonderful at first, but soon become repetitive, as do your mission goals and the means by which you achieve them. The utter lack of "healing meat" in some of the thickest situations creates frustrating die-and-reload scenarios. Furthermore, some areas can't be reached without a very specific mutation, such as better jumping, but if you spent your mutations building a fighter, you might be stuck until you can scrounge up some more jumping DNA. Limited control over the other three Genohunters also hampers any real squad-level tactics. We had trouble with the AI-controlled allies, as well; they often step in your way and hobble your attacks on the enemy.

In the end, Evolva is a standard third-person shooter with interesting creature designs and a unique mutation element, but only average gameplay.

—T. Liam McDonaldß

PLUSES
- Mutation element can create intriguing combinations
- Visually stylish with good object models
- Slick weapon mutation animations

MINUSES
- Tedious levels
- Lack of healing DNA adds to difficulty
- Limited control over other three Genohunters

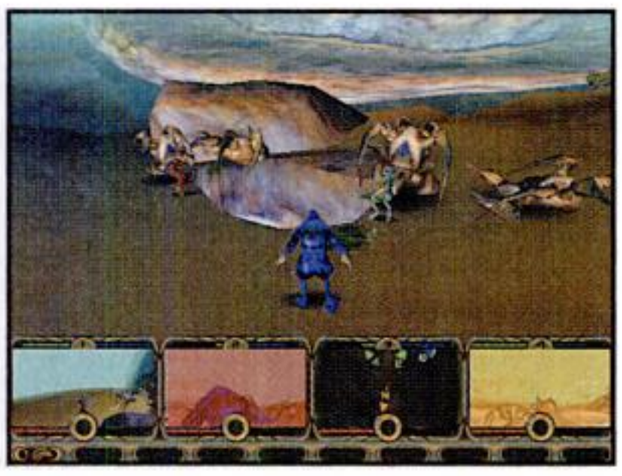
THE SPECS

3D CARD SUPPORT
Direct3D

3D AUDIO SUPPORT
DirectSound

MULTIPLAYER
LAN and TCP/IP

TOTAL PLAYERS
8



The highlight of *Evolva* is its wide array of creatures and mutations.

MAXIMUM PC VERDICT **7**

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Getting on the Right Track

THREE PROGRAMS LET YOU MIX AND MATCH AUDIO

SAW32 LITE

PLUSES
- Seriously professional
- Powerful interface design
- Incredibly well coded
- Compact and concise

MINUSES
- Seriously professional
- Intimidating to newbies
- No MP3/ compressed audio support

Music is naturally interactive. We don't just want to listen—we want to take it apart, reshape it, and remix it into something that's our own. Multitrack software gives you that kind of control. Whether you're creating a song from the ground up or transforming existing recordings into something new, multitrack software is a key tool for sound engineers and audio anarchists. The market is replete with full-featured products that offer much of the same functionality to differing degrees. All of the software can work virtual miracles in audio production, and choosing among them is a matter of personal taste and your media creation needs. Each package reviewed here offers a decent download demo version to help you decide which is right for you.

Software Audio Workshop has a killer inteface that's as customizable as the music you can produce with it.

International Quality Software SAW32 Lite

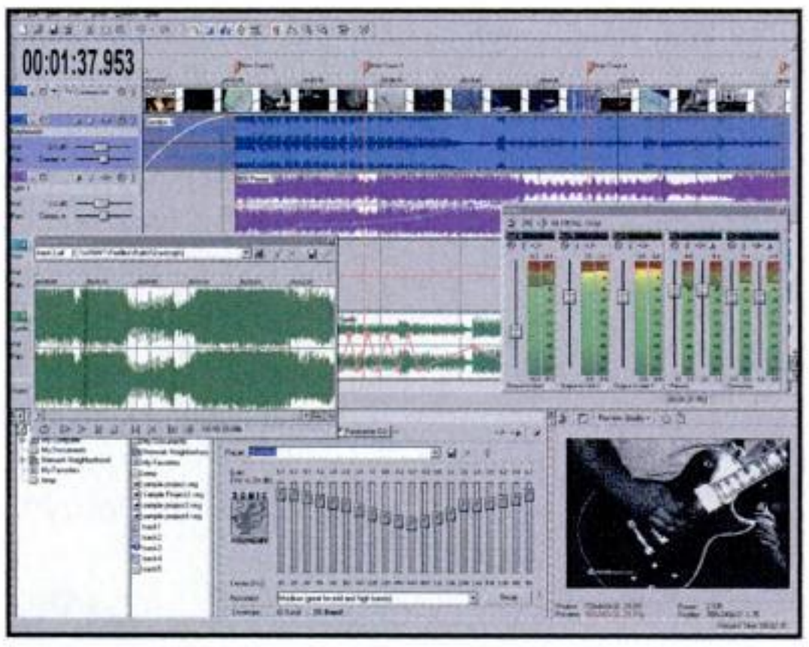
If you don't automatically tune out when commercials are played on the radio, you're probably familiar with *SAW*. *SAW* stands for *Software Audio Workshop* (**www.iqsoft.com**) and it's the de facto standard for mixing audio used for radio commercials. *SAW* was one of the first products of its kind on the market; the earliest versions were among the first computer programs to make splicing reel-to-reel tape with a razor and tape obsolete. Given its heritage, it's no surprise that the current rev of *SAW* is the essence of elegance.

Hand-coded in assembly language, the whole program is only about a megabyte in size, allowing it to run like DOS on a power user rig—very fast. Also, the company's tech support is terrific. Continual upgrades and tweaks to the code are available online and make for stable, robust software. (Are you listening, Microsoft?) It's also worth a trip to the IQSoft web site to check out some of the freeware utilities available for download, including a killer hard drive benchmark that we've recently been playing around with in the Lab.

The *SAW* interface makes few compromises. Rather than falling back on the standard Windows-like interface of general-purpose software, *SAW* gets about as far from the "one size fits all" approach as possible. In fact, the layout is highly customizable. The result is an audio production workstation that happens to be on a PC. Getting the hang of even the presets may momentarily raise anxiety levels for newbies but, once familiar, riding without the Windows training wheels makes for a much better ride.

The entry-level version reviewed here, *SAW32 Lite*, is limited to handling eight stereo tracks and can manage three stereo soundcards inputting audio. So if you want the program to handle a serious recording session, you can connect up to six inputs (the full version of *SAW32* allows 16 tracks, and *SAWPlus32* will handle a full 24-track recording). The *Lite* version only records at 16-bit/48KHz audio quality, but, depending on the rest of your recording setup, that may not be an issue.

Aside from the 16/48 limitation, the *Lite* version retains the full functionality of all but the most advanced *SAW* version and is likely to be more than enough for most home users. Users who appreciate the advanced capabilities will relish moving into the upper echelons of performance that *SAW* offers.



Vegas, baby! *Vegas Audio* is very customizable and tames the whole menagerie of audio formats as well. As a bonus, it plays well with Vegas Video.

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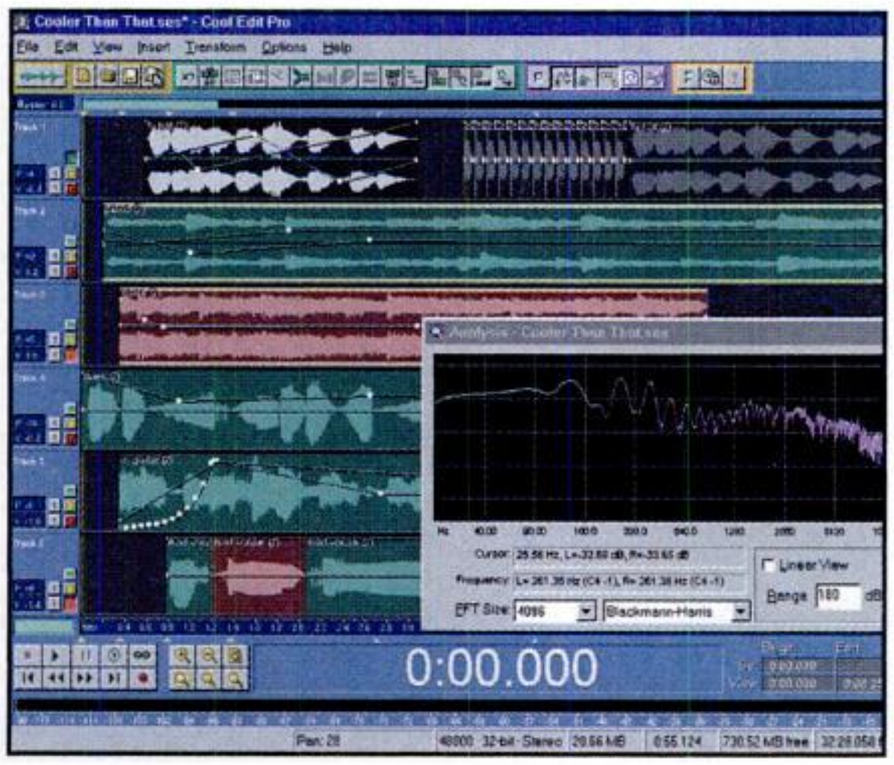
The depth of the *SAW* product line means that the time invested in learning the interface is never wasted. On the downside, *SAW32* is almost completely geared toward the pro audio user and lacks various consumer amenities such as support for different audio formats found online, including MP3. If the world were made up of music composers, this would get a Kick Ass Award. But in this grungy, post-modern pop reality, *SAW*'s purity is a shortcoming.



***Cool Edit Pro* is so easy to use, it's almost insulting. In the long run, however, you're stuck with the interface presets, so what you see is what you get.**

Syntrillium Cool Edit Pro

Cool Edit Pro (**www.syntrillium.com**) is the easiest package to quickly get up and running. In minutes, we were mixing audio tracks like professionals thanks to its obscene level of user-friendliness. *Cool Edit Pro* is the full-featured version of the inexpensive *Cool Edit 2000* package. The key to its ease of use is its slick interface—inviting, not intimidating. The downside is that the expert user can't customize the interface. The basic recording, editing, and mixing features seem as simple as operating a CD player. Though the program comes with a complete 200-plus-page manual, the manual is meant to be a last-resort reference. Syntrillium's goal is to make a simpler interface, not a thicker manual.

Cool Edit Pro throws in a whole rack of audio processing features. You can take sound gathered from any source—old LPs, VCR movie sound bites, radio recordings, Grateful Dead bootlegs—and clean them up to insert into recordings. Noise reduction options remove pops and tics, and can also stretch or shrink sound without altering the pitch of the recording. Or, if you prefer, you can take something that's slightly out of key and make it the right pitch.

Cool Edit Pro can handle up to 64 tracks of 24/96 audio (ultra high fidelity) for playback, and up to 16 soundcards (32 tracks) for recording. The limit here is more likely to be hard drive access, as even Ultra160 SCSI will bog down with that much data moving across the bus. And doing audio processing on a lot of tracks at once in realtime is a major CPU hog. In other words, *Cool Edit* is more than a match for almost any PC. As far as handling the online menagerie of file formats, *Cool Edit Pro* supports over 16 of them, including the usual suspects. For full MP3 encoding capabilities, an optional Fraunhoffer codec plug-in is available for $30.

Sonic Foundry Vegas Audio

Vegas Audio (**www.sonicfoundry.com**) includes an amazing range of audio production tools—enough to mix and master almost anything you can throw at it. The bundle includes the full catalog of Sonic Foundry's audio processing programs. Until now, you'd have to buy these as three separate bundles of the company's DirectX plug-ins. *XFX-1*, *2*, and *3* cost $150 each, so getting all 18 effects in *Vegas Audio* for just a few more bucks is a great deal.

Vegas Audio can handle virtually any file format including RealMedia 8, Windows Media 7, and Quicktime 4.0. Throw different kinds of audio files on different tracks and it will resample and process them to work together on the fly. A "scrub" option lets you slow down, speed up, or even reverse playback to find the exact place where you want to insert a sound.

Vegas also offers a customizable interface. It isn't as intuitive as *Cool Edit Pro*, but like *SAW*, it's rewarding to those who take the time to learn it.

Perhaps the greatest reason to adopt *Vegas* as the multitracker-of-choice is its video functionality. Say you want to change the audio track under a DV recording—*Vegas* makes it simple. Video clips appear over the audio track, letting you synchronize sound files perfectly with events on video. It's more than adequate for tweaking sound in edited video, but hardcore DV users will want to stick with *Vegas Video*, Sonic Foundry's flagship DV product. Another important consideration is how well *Vegas Audio* integrates with the rest of Sonic Foundry's line. So, for example, if you want to get into full-blown DV work, the step up to *Vegas Video* is easy.

The shortcoming of this package is that it provides too much of a good thing. Beginners are liable to feel completely overwhelmed. But with a little determination, *Vegas* can do for the A/V world what *Photoshop* does for still photography; it's the one program that can handle all of your needs. It's true that this is the most expensive package reviewed here, but it's worth every cent. And yes, it kicks ass.

—Carl Lindemann

COOL EDIT

PLUSES
- Very easy to master
- Supports wide variety of file formats
- Powerful audio processing tools

MINUSES
- Little flexibility in interface layout

SONIC

PLUSES
- Powerful
- Endless usability

MINUSES
- It takes time to master the muscle power

SAW32 LITE — 7
$300 ($250 by download)
IQSoft
Buy www.seemebuyme.com/mpc1142

COOL EDIT PRO — 8
$450 | Syntrillium
Buy www.seemebuyme.com/mpc1143

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EPoX EP-MVP3C2	MB5406	VIA Apollo MVP3	512	384	3		Award		UltraDMA/66	4	2	1	Baby AT	2 Yrs.	$85	$145	$173	$145
EPoX EP-MVP3G5	MB5405	VIA Apollo MVP3	2048	384	3		Award		UltraDMA/66	5	2	1	ATX	2 Yrs.	$110	$170	$198	$170
FIC VA-503+	MB5211	VIA Apollo MVP3	1024	512	2	4	Award			3	3	1	Baby AT	1 Yr.	$76	$136	$164	$136
Pine VA7-AV	MB5300	VIA Apollo MVP4	512	768	3		Award	AC-97	UltraDMA/66	5	2		ATX	3 Yrs.	$93	$153	$181	$153
Tyan S1590S Trinity 100AT	MB5006	VIA Apollo MVP3	1024	384	3	2	Award			4	4	1	Mini AT	3 Yrs.	$99	$159	$187	$159

Slot A	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Bus Frequency	Integrated Controller	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/AMD Athlon™ 800MHz	w/AMD Athlon 850MHz	w/AMD Athlon 900MHz	w/AMD Athlon 950MHz	w/AMD Athlon 1000MHz	w/AMD Athlon 1100MHz
ABIT KA7-100	MB7502	VIA Apollo KX133	2048	4	Award	200/133	UltraDMA/100	6	1	1	ATX	1 Yr.	$189	$394	$414	$479	$524	$629	$769
Asus K7V	MB7703	VIA Apollo KX133	1536	3	Award	200/133	UltraDMA/66	5		1	ATX	1 Yr.	$155	$360	$380	$445	$490	$595	$735
EPoX EP-7KXA	MB7850	VIA Apollo KX133	768	3	Award	200/133	UltraDMA/66	5	1	1	ATX	2 Yrs.	$120	$325	$345	$410	$455	$560	$700
Shuttle AI61	MB7901	AMD-750	768	3	Award	100	UltraDMA/66	5		1	MicroATX	1 Yr.	$93	$298	$318	$383	$428	$533	$673
Tyan S2380 Trinity K7	MB7000	VIA Apollo KX133	768	3	Award	200/133	UltraDMA/66	6	1	1	ATX	3 Yrs.	$121	$326	$346	$411	$456	$561	$701

Socket A	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Bus Frequency	Integrated Controller	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/AMD Duron™ 600MHz	w/AMD Duron 650MHz	w/AMD Duron 700MHz	w/AMD Duron 750MHz	w/AMD Athlon™ 800MHz with Enhanced Cache	w/AMD Athlon 850MHz with Enhanced Cache	w/AMD Athlon 900MHz with Enhanced Cache	w/AMD Athlon 950MHz with Enhanced Cache	w/AMD Athlon 1000MHz with Enhanced Cache	w/AMD Athlon 1100MHz with Enhanced Cache
ABIT KTV	MB7503	VIA Apollo KT133	1536	3	Award	200/133	UltraDMA/66	6	1	1	ATX	1 Yr.	$173	$244	$258	$273	$303	$378	$398	$463	$508	$613	$753
ABIT KTV-RAID	MB7504	VIA Apollo KT133	1536	3	Award	200/133	DMA/100 RAID	6	1	1	ATX	1 Yr.	$199	$270	$284	$299	$329	$404	$424	$489	$534	$639	$779
ASUS A7V	MB7704	VIA Apollo KT133	1536	3	Award	200/133	UltraDMA/100	5		1	ATX	1 Yr.	$175	$246	$260	$275	$305	$380	$400	$465	$510	$615	$755
EPoX EP-8KTA	MB7851	VIA Apollo KT133	768	3	Award	200/133	UltraDMA/66	6	1	1	ATX	2 Yr.	$127	$198	$212	$227	$257	$332	$352	$417	$462	$567	$707
FIC AZ11	MB7402	VIA Apollo KT133	1536	3	Award	200/133	UltraDMA/66	5		1	ATX	1 Yr.	$128	$199	$213	$228	$258	$333	$353	$418	$463	$568	$708
Microstar K7T Pro	MB7203	VIA Apollo KT133	1536	3	Award	200/133	UltraDMA/66	5		1	ATX	1 Yr.	$147	$218	$232	$247	$277	$352	$372	$437	$482	$587	$727
Tyan S2390 Trinity KT	MB7001	VIA Apollo KT133	1536	3	Award	200/133	UltraDMA/66	6	1	1	ATX	3 Yr.	$147	$218	$232	$247	$277	$352	$372	$437	$482	$587	$727

Slot 1	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	168-pin RIMM Sockets	Flash BIOS	Integrawed Audio	Integrawed Controller	PCI Slots	ISA Slots	AGP Slot	Formaw	Manufacturer's Warranty	Motherboard Only	w/Intel® Pentium III® 667 256K OD 133MHz FSB	w/Intel Pentium III 733 256K OD 133MHz FSB	w/Intel Pentium III 800/EB 256K OD 100/133MHz FSB	w/Intel Pentium III 850 256K OD 100MHz FSB	w/Intel Pentium III 933 256K OD 133MHz FSB	w/Intel Pentium III 1000 256K OD 133MHz FSB	w/Dual Intel Pentium III 800 256K OD 100MHz FSB	w/Dual Intel Pentium III 850 256K OD 100MHz FSB
ABIT BE6-II	MB6508	Intel 440BX	768	3		Award		UltraDMA/66	5	1	1	ATX	1 Yr.	$140	N/A	N/A	$380	$440	N/A	N/A	N/A	N/A
ABIT BX133-RAID	MB6513	Intel 440BX	768	3		Award		DMA/100 RAID	5	1	1	ATX	1 Yr.	$169	N/A	N/A	$409	$469	N/A	N/A	N/A	N/A
ABIT VT6X4	MB6510	VIA Apollo Pro 133A	768	3		Award	AC-97	UltraDMA/66	5	2	1	ATX	1 Yr.	$103	$308	$343	$343	$403	$533	$678	N/A	N/A
ASUS P2B-DS (Dual)	MB6707	Intel 440BX	1024	4		Award			4	2	1	ATX	1 Yr.	$509	N/A	N/A	$749	$809	N/A	N/A	$989	$1109
ASUS P3B-F	MB6720	Intel 440BX	1024	4		Award			6	1	1	ATX	1 Yr.	$145	N/A	N/A	$385	$445	N/A	N/A	N/A	N/A
ASUS P3V4X	MB6723	VIA Apollo Pro 133A	1024	4		Award		UltraDMA/66	6	1	1	ATX	1 Yr.	$133	$338	$373	$373	$433	$563	$708	N/A	N/A
Intel L440GX+ (Dual)	MB6917	Intel 440GX	2048	4		Intel/Phoenix		Adaptec 2-Ch U2W	6	1		ATX	3 Yrs.	$544	N/A	N/A	$784	$844	N/A	N/A	$1024	$1144
Intel SE440BX-2 "Seattle"	MB6921	Intel 440BX	768	3		Intel/Phoenix			4	2	1	ATX	3 Yrs.	$120	N/A	N/A	$360	$420	N/A	N/A	N/A	N/A
Shuttle AV64	MB6309	VIA Apollo Pro 133A	768	3		Award		UltraDMA/66	5	2	1	ATX	1 Yr.	$96	$301	$336	$336	$396	$526	$671	N/A	N/A
SuperMicro P6DGU (Dual)	MB6122	Intel 440GX	2048	4		AMI		Adaptec U2W	5	2	1	ATX	1 Yr.	$485	N/A	N/A	$725	$785	N/A	N/A	$965	$1085
SuperMicro P6SBA	MB6120	Intel 440BX	768	3		AMI			4	3	1	ATX	1 Yr.	$103	N/A	N/A	$343	$403	N/A	N/A	N/A	N/A
SuperMicro P6SBU	MB6128	Intel 440BX	1024	4		AMI		Adaptec U2W	4	3	1	ATX	1 Yr.	$343	N/A	N/A	$583	$643	N/A	N/A	N/A	N/A
Tyan S1834 Tiger 133 (Dual)	MB6020	VIA Apollo Pro 133A	2048	4		Award		UltraDMA/66	6	1	1	ATX	3 Yrs.	$162	$367	$402	$402	$462	$592	$737	$642	$762

Socket 370	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Integrated Audio	Integrated Video	Integrated Controller	PCI Slots	ISA Slots	AGP Slot	AMR or CNR Slot	Format	Manufacturer's Warranty	Motherboard Only	w/Intel® Celeron™ 600 128K OD 66MHz FSB	w/Intel Celeron 700 128K OD 66MHz FSB	w/Intel Celeron 733 128K OD 66MHz FSB	w/Intel Pentium® III 667 256K OD 133MHz FSB	w/Intel Pentium III 733 256K OD 133MHz FSB	w/Intel Pentium III 800/EB 256K OD 100/133MHz FSB	w/Intel Pentium III 850 256K OD 100MHz FSB	w/Intel Pentium III 866 256K OD 133MHz FSB	w/Intel Pentium III 933 256K OD 133MHz FSB	w/Intel Pentium III 1000 256K OD 133MHz FSB	w/Dual Intel Pentium III 800EB 256K OD 133MHz FSB
ABIT SE6	MB6512	Intel 815E	768	3	Award	Intel 815E	Intel 815E		6		1	1	ATX	1 Yr.	$169	$269	$289	$314	$374	$409	$409	$469	$469	$599	$744	N/A
ABIT VH6	MB6511	VIA Apollo Pro 133A	768	3	Award	AC-97			5	1	1	1	ATX	1 Yr.	$113	$213	$233	$258	$318	$353	$353	$413	$413	$543	$688	N/A
ASUS CUBX	MB6726	Intel 440BX	1024	4	Award	AC-97			6	1	1		ATX	1 Yr.	$149	$249	$269	$294	N/A	N/A	$389	$449	N/A	N/A	N/A	N/A
ASUS CUSL2	MB6727	Intel 815E	1536	3	Award	Intel 815E	Intel 815E		5	1	1	1	ATX	1 Yr.	$174	$274	$294	$319	$379	$414	$414	$474	$474	$604	$749	N/A
ASUS CUR-DLS (Dual)	MB6728	ServerWorks LE	4096	4	Award		RAGE-XL		7				ATX	1 Yr.	$599	$699	$719	$744	$804	$839	$839	$899	$899	$1029	$1174	$1079
ASUS CUV4X	MB6725	VIA Apollo Pro 133A	1536	3	Award	AC-97			5	1	1	1	ATX	1 Yr.	$133	$233	$253	$278	$338	$373	$373	$433	$433	$563	$708	N/A
EPoX EP-3VCA2	MB6856	VIA Apollo Pro 133A	768	3	Award	AC-97			5		1	1	ATX	2 Yrs.	$109	$209	$229	$254	$314	$349	$349	$409	$409	$539	$684	N/A
Intel D815EEA "Easton"	MB6922	Intel 815E	512	3	Award	Intel 815E	Intel 815E		5		1	1	ATX	3 Yrs.	$168	$268	$288	$313	$373	$408	$408	$468	$468	$598	$743	N/A
Shuttle AV14	MB6311	VIA Apollo Pro 133A	768	3	Award				5	2	1		ATX	1 Yr.	$99	$199	$219	$244	$304	$339	$339	$399	$399	$529	$674	N/A
Shuttle ME21	MB6312	Intel 815E	512	2	Award	Intel 815E	Intel 815E		3		1	1	Micro ATX	1 Yr.	$144	$244	$264	$289	$349	$384	$384	$444	$444	$574	$719	N/A
Shuttle ME64	MB6310	Intel 810E	512	2	Award	Intel 810E	Intel 810E		3			1	Micro ATX	1 Yr.	$118	$218	$238	$263	$323	$358	$358	$418	$418	$548	$693	N/A
SuperMicro 370SEA	MB6140	Intel 810E	512	2	AMI	Intel 810E	Intel 810E		6	1		1	ATX	1 Yr.	$142	$242	$262	$287	$347	$382	$382	$442	$442	$572	$717	N/A
SuperMicro 370SSA	MB6140	Intel 815E	512	2	AMI	Intel 815E	Intel 815E		6		1	1	ATX	1 Yr.	$162	$262	$282	$307	$367	$402	$402	$462	$462	$592	$737	N/A
SuperMicro 370DLE (Dual)	MB6154	ServerWorks LE	2048	2	AMI				6	1			ATX	1 Yr.	$342	$442	$462	$487	$547	$582	$582	$642	$642	$772	$917	$822
SuperMicro 370DL3 (Dual)	MB6155	ServerWorks LE	2048	2	AMI				6	1			ATX	1 Yr.	$545	$645	$665	$690	$750	$785	$785	$845	$845	$975	$1120	$1025
Tyan S1854 Trinity 400	MB6018	VIA Apollo Pro 133A	768	3	Award				6	1	1		ATX	3 Yrs.	$109	$209	$229	$254	$314	$349	$349	$409	$409	$539	$684	N/A

Slot 2	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Integrated Audio	Integrated Video	Integrated Controller	Integrated Networking	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/Intel® Pentium III® Xeon™ 550MHz 512K 100MHz FSB	w/Intel Xeon 550MHz 1M 100MHz FSB	w/Intel Xeon 550MHz 2M 100MHz FSB	w/Dual Intel Xeon 550MHz 512K 100MHz	w/Quad Intel Xeon 550MHz 512K 100MHz	w/Intel Xeon 700MHz 1M 100MHz FSB	w/Intel Xeon 700MHz 2M 100MHz FSB	w/Dual Intel Xeon 700MHz 1M 100MHz	w/Quad Intel Xeon 700MHz 1M 100MHz
SuperMicro S2DL3	MB6163	ServerWorks LE	4096	4	AMI			Adaptec Ultra160	Intel 82552	6	1		ATX	1 Yr.	$676	$1776	$3006	$5016	$2876	N/A	$2076	$3026	$3476	N/A
SuperMicro S2QR6	MB6190	ServerWorks HE	16384	16	AMI			Adaptec 2-Ch Ultra160	Intel 82559	8			SWTX	1 Yr.	$2799	$3899	$5129	$7139	$4999	$7199	$4199	$5149	$5599	$8399

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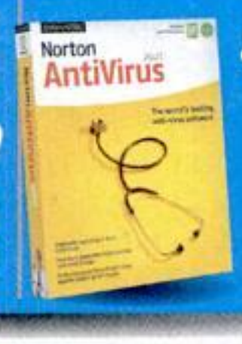

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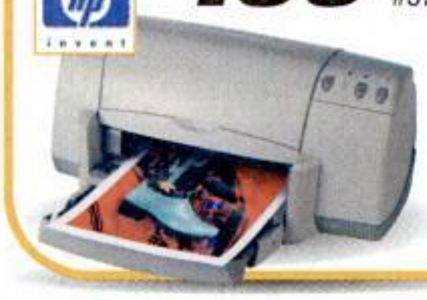

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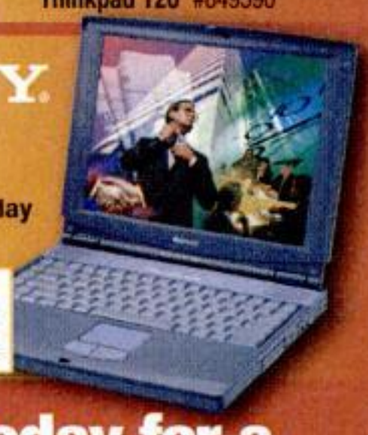

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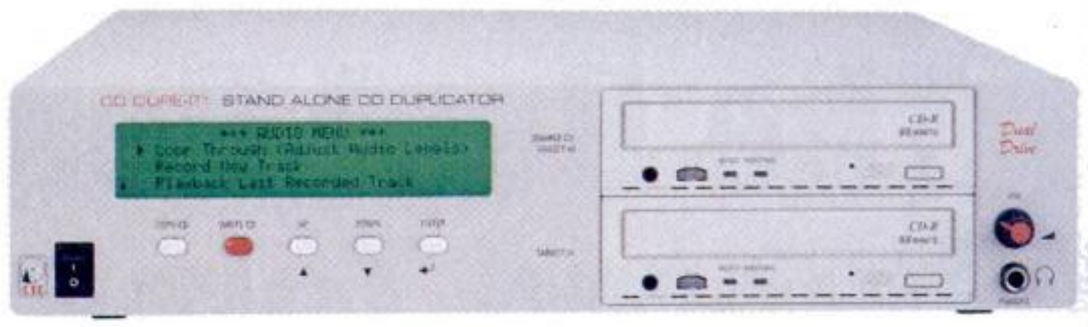

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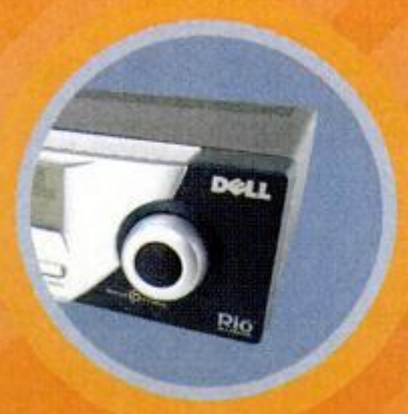

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The Daily Glitch

Apex of Accuracy, Paragon of Truth * Wednesday, November 1, 2000

No Sim Sim For You!

Maxis recently announced that it has discontinued development of *SimGame*, the expansion pack it had been developing for *The Sims* reality simulator. The add-on would have allowed your Sims to play computer games such as *SimCity*, *SimTower*, and even *The Sims* itself during actual game play. Unfortunately, the add-on code introduced ripples in the time-space continuum of the Sims' simulated universe, and while the ripples were in fact only simulated ripples, they still made the Sims' heads explode whenever they launched their simulated sims.

—Josh Catone

Maxis decides to pull the plug on its fatally paradoxical Sim Sim project.

Editor to Ignore Violence Advisory

Brody Plumb, editor-in-chief of *Type-O Gaming*, has announced that he will ignore the U.S. Senate's impending request that all journalists refrain from celebrating violent video games. When asked to elaborate, Plumb said, "Buzz off, I'm fragging chum—and lots of it. I'm fragging chum in the morning, I'm fragging chum in the evening, I'm fragging chum the whole live-long day."

—Jon Phillips

Detroit Power User Not Sure, But...

PC enthusiast Grant Donahue of Detroit, Michigan isn't sure, but he believes his computer's recent instability can be ascribed to buggy videocard drivers.

"I'm not sure, but I think these latest beta drivers are essentially walking up to Windows 98, putting a gun to its head, pulling the trigger, and saying 'Bang-bang. This little piggy cried all the way home.'

"I'm also not sure, but I believe overclocking my frontside bus to 112MHz might be adding to the system's instability. So it could be that, too.

"And while I wouldn't purport to be absolutely, 100-percent sure, I do suspect that my recent spelunking in the deep recesses of my Registry might be adding a bit of shimmy to my system as well."

Before he was done pontificating, Donahue qualified no fewer than 102 system tweaks as possible reasons why his PC might be crashing. He isn't sure, but he hopes to do a full reformatting next week. Hopefully.

—Jon Phillips

Last Possible Domain Name Registered

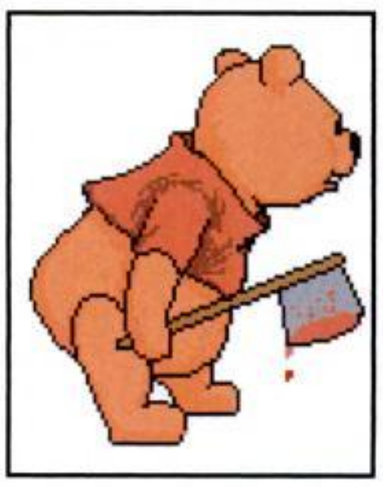
The web-watching company Media Metrix reports that the last available dot-com domain was registered last night. Larry Phelps of Tacoma, Washington is now the proud owner of the last possible 1- to 26-character combination.

Phelps told reporters that his domain, j3io9ehcx-85dwha9kfndl_4xs.com, "is a winner." Phelps said that he might be persuaded to sell the domain to the highest bidder, but added that he has an emotional attachment to the name, and might just keep it to sell j3io9ehcx and j3io9ehcx-related products.

—Josh Catone

Hunting Game Improved

BuggySoft has announced that its latest offering in the *Deer 'n' Beer* series will drop archaic software rendering for a near state-of-the-art truncated version of the *Winnie the Pooh Preschool* engine. Other improvements include fewer deer, even more hours of waiting for targets to appear, more beer, and five new flannel patterns for your hunting garments. *BnD2K* will be bundled with *Taxidermy Pro 1.2*, which will allow you to gut and mount your virtual kills in an antiseptic environment.



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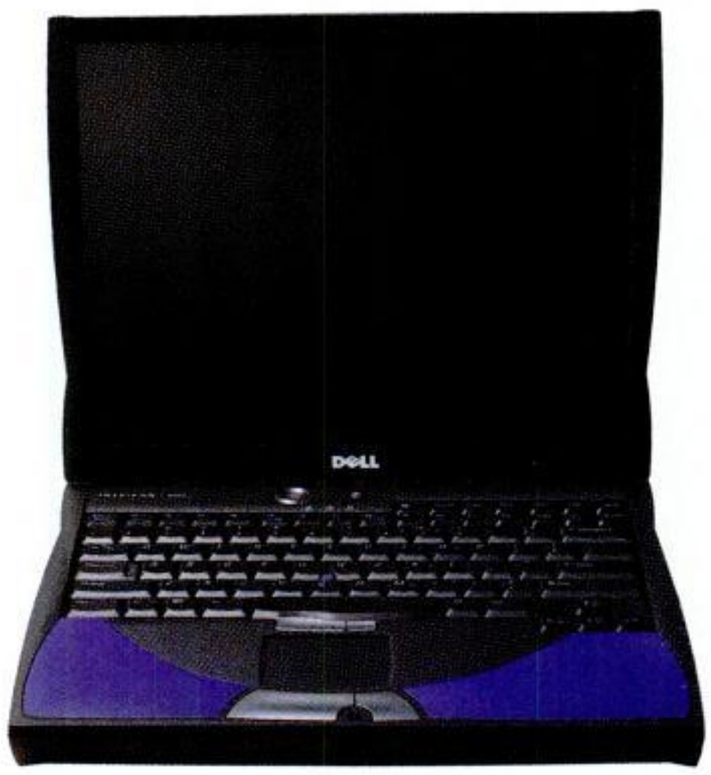

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